MARCH 1954

FOUNDRY

...WHEREVER METALS ARE CAST

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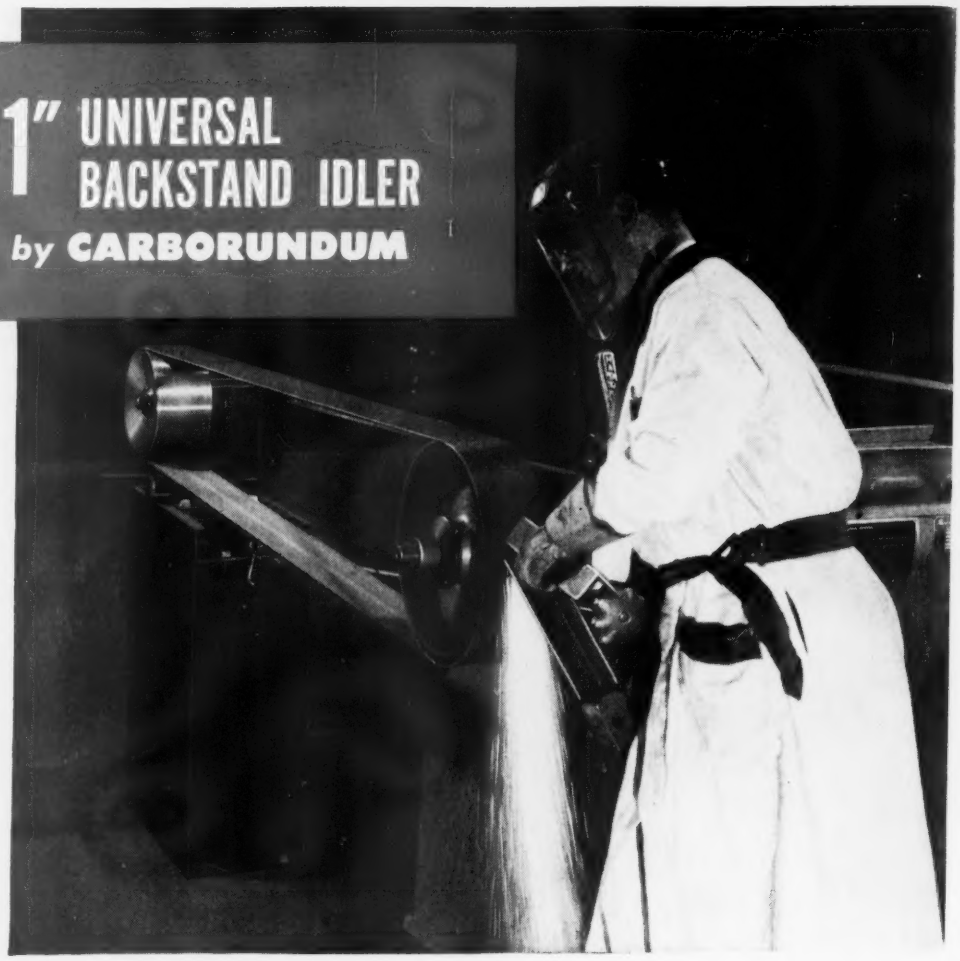
TRADE NAMES of Foundry Equipment, Supplies and Services

Here is an assist for foundries seeking sources of supply for a material, machine or service that is identified by its trade name. A listing of the more than 2300 trade names used by 925 suppliers to the foundry industry is included in this issue.

—see page 165

NEW "61" UNIVERSAL BACKSTAND IDLER
by CARBORUNDUM

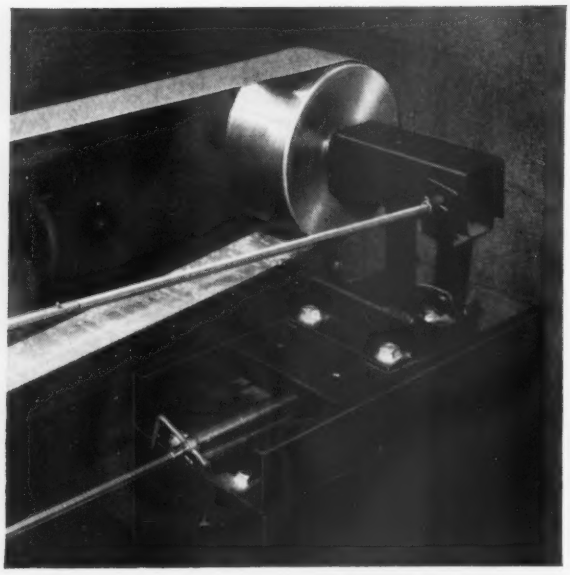


...rugged

...versatile

...easy to operate

...low-priced



TWO STURDY MODELS: Model 432 for floorstand operations (shown here); and model 431—a smaller, more compact unit—for bench, wall or floor mounting. Both models offer you the same features, economies, and ease of operation.

Here's a new backstand idler—rugged enough for heavy production grinding, yet ideal for the shop where varied jobs call for frequent, fast set-up changes. Check these practical features:

NO CENTER ALIGNMENT NECESSARY between idler pulley and contact wheel ... thanks to patented tracking device.

QUICKLY ADJUSTABLE for contact wheels of varying diameters and widths, belts of varying length.

USES ANY WIDTH abrasive belt from ½" to 8".

PREVENTS "ONE-SIDE" STRETCH of abrasive belts ... assures dependable, even grinding under all conditions.

FINGERTIP CONTROL of belt tension and tracking—from the operator's position ... at no extra cost.

POSITIVE TENSION CONTROL ... no springs.

DOUBLE SUPPORT for perfectly balanced idler pulley insures vibration-free performance.

REASONABLE PRICE: Model 432—$76; Model 431—$61.

For best results, top operating economy, use CARBORUNDUM's belt-saving "61" or "T-61" Contact Wheels and CARBORUNDUM® Brand Abrasive Belts with the "61" Universal Backstand Idler. Get full details today from your CARBORUNDUM Distributor or Salesman (listed in the yellow pages under "Abrasives" or "Grinding Wheels.")

WRITE FOR the folder describing CARBORUNDUM's "61" Universal Backstand Idler—address The Carborundum Company, Dept. F 82-44, Niagara Falls, New York.

CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more SENSE in your abrasive DOLLAR

Every Foundryman

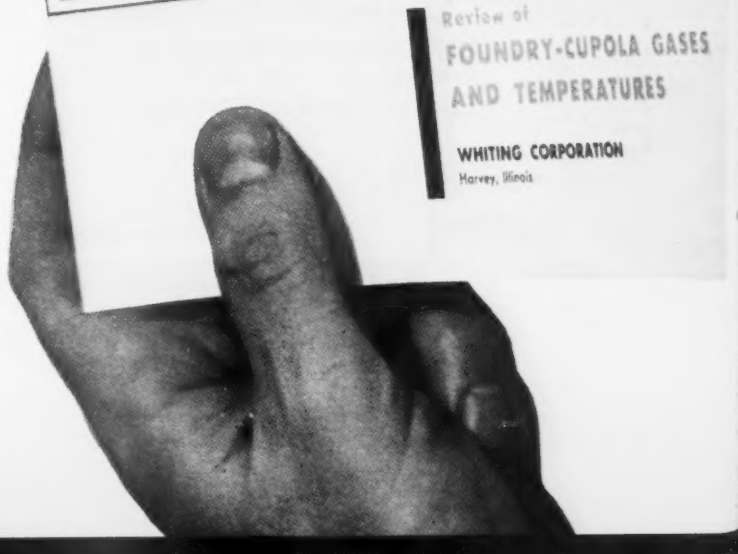
SHOULD READ THIS REPORT!

A Review of One of the Most Outstanding Contributions to the Solution of Cupola Problems

40 years ago, A. W. Belden wrote a paper that has stood the test of time and continues to be an outstanding contribution to our knowledge of the composition of the gases and distribution of temperature in the melting zone of a cupola. This paper has assumed new importance in the light of more recent information on the behavior of foundry cupolas and is reviewed by H. W. Lownie, Jr., Battelle Memorial Institute. Containing graphic presentations and complete analyses, this report will help foundrymen understand many troubles encountered from "low beds" and "oxidized iron". *Write for this informative 6-page report today . . . ask for free bulletin FO-9.*

WHITING CORPORATION

15607 Lathrop Avenue, Harvey, Illinois



WHITING

Write for these other Whiting Bulletins:

"How To Make Your Cupola Operation More Efficient"	FO-1
"Tips on Improving Cupola Charging"	FO-2
"Hot Blast"	FO-3
"Facts on Duplexing"	FO-4
"Here's How To Save Melting Fuel"	FO-5
"The Electric Furnace In the Iron Foundry"	FO-6
"Cupola Blast Control"	FO-7
"Suggestions for Solving Some Cupola Operation Problems"	FO-8

WRITE FOR YOUR COPY

of FEDERAL'S
useful **BULLETIN**
on the preparation
of "tailor-made"
molding sands

If you have not already done so, you really should send for this bulletin, for hundreds of foundrymen have found it to be extremely helpful in the preparation of molding sands.

It explains in detail the seacoal-bentonite-stabilizer method of sand preparation. It fully describes the three additives—the properties they provide for sand mixtures—how to use them—and suggests a variety of sand mixtures for different types of castings.

An overwhelming majority of iron foundries now use this method of sand preparation. It is thoroughly dependable, produces excellent castings, does *not* require close sand control and . . . the three additives actually cost *less than $1.00 per ton of castings produced.*

Therefore, if you're using any other method of sand preparation—using other materials that cost more and require exacting sand control—then investigate this *better* method. Write for FEDERAL's Molding Sand Bulletin . . . NOW!

DUSTLESS
SEACOAL *and* PITCH BINDERS

CROWN HILL SEACOAL AND FEDERAL PITCH BINDERS now come in the new "dustless" grades as well as regular. They're chemically treated to minimize dustiness in handling. The slight additional cost is more than offset by more healthful working conditions, better "housekeeping" and the elimination of losses in air-swept mixing and handling equipment. Ask your FEDERAL representative to demonstrate the new "dustless" additives.

Make your foundry a better place in which to work!

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON WYO.

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FOUNDRY

Volume 82—Number 3

MARCH 1954

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Magnesium Sand Foundry Produces Varied Castings 102
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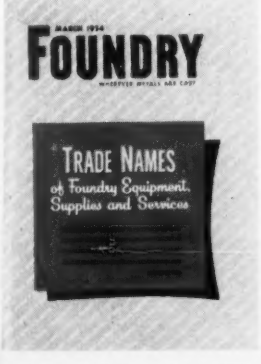

THE COVER: More than 2300 trade names and trade-marked products and services offered to foundries by over 925 suppliers are presented in a special section. P. 165

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the fastest-moving line in the Foundry Field... on its way to you . .

Archer **LIN•O•CEL** is the most effective sand stabilizer available. It improves flowability, which in turn, produces better tolerance and definition. Because LIN-O-CEL compensates for sand expansion, it stops rat-tails, buckles, and scabs which normally might occur due to denser rams made possible by improved flowability.

LINOIL, the most-used core oil in America, produces stronger cores at less cost. You can find among the seven grades of "700 LINOILS", for instance, an oil practically tailor-made to your core requirements. Whatever the grade selected, you can depend upon uniformity from shipment to shipment.

STOP!

Whether or not you are using ADM foundry products, it pays periodically to check your core mixture. Proper use of any material will save you production dollars. Your LINOIL man can assist you in analyzing your specific core problems. He is backed by fully-equipped laboratories, experienced ADM chemists, and foundry technicians who will analyze your problems upon request.

Impoved foundry methods demand a constant flow of modified oils and binders, as well as entirely new products for core making and molding. The need today is for greater efficiency at lower cost.

ADM keeps pace with the foundry industry by anticipating its needs through never-ending research. Proof lies in the fact that more than half the core binders consumed in American foundries are made by ADM. Furthermore, foundrymen know they can rely on ADM for absolute uniformity . . . and service second to none.

. . from ONE SOURCE!

INDUCTOL, the new pre-baked core oil, bakes in half the time required for conventional oils. It bakes over a wide temperature range and resists over-baking so that large and small cores can be successfully baked at the same time. INDUCTOL produces considerably less gas than most core oils.

FREFLO is used two ways: (1) As a core sand conditioning agent to reduce stickiness and improve workability. (¼ of 1% by weight should be added during the final 30 seconds of mixing.) (2) As a parting compound for metal molding patterns. FREFLO is a great aid in modern, high-speed equipment.

The most recent addition to the ADM line is **ADMIREZ** resin binders. Available in urea and phenol formaldehyde types in both liquid and powdered forms for cores. Phenol type also available in powdered form for "C" (or shell molding) process.

EREVER YOUR FOUNDRY .OCATED, there is an ADM e close by. Contact the one in locality for full details on the st-moving line in the foundry . Addresses are listed here.

ALABAMA
2931 Seventh Avenue, N.
Birmingham 1,

CALIFORNIA
2444 E. Fifty-Seventh St.
Los Angeles 58,
40th and Linden Streets
Oakland 8,

COLORADO
1732 Blake Street
Denver 2,

ILLINOIS
927 Blackhawk Street
Chicago 22,
3847 28th Avenue
Rock Island

INDIANA
18 S. New Jersey Street
Indianapolis 4,

KANSAS
1721 Minnesota Avenue
Kansas City 2,

MASSACHUSETTS
141 Milk Street
Boston 9,

MICHIGAN
18911 James Couzens Hgwy.
Detroit 35,

MINNESOTA
600 Roanoke Building
Minneapolis 2,

MISSOURI
No. 2 Armin
St. Louis 19,

NEW YORK
1524 Marine Trust Building
Buffalo 3,
9th Floor Woolworth Bldg.
New York 7,

OHIO
2191 West 110th Street
Cleveland 2,
1935 Le Veque
Lincoln Tower
Columbus 15,
1152 East Broadway
Toledo 5,

OREGON
15 S.W. Arthur Street
Portland 1,

PENNSYLVANIA
Manheim Pike & Keller Ave.
P.O. Box 1412
Lancaster,
18 Hilltop Road
Philadelphia 18,

UTAH
539 W. 6th, South
Salt Lake City 4,

WASHINGTON
1217 Sixth Avenue, South
Seattle 4,
1133 W. College Avenue
Spokane 11,

WISCONSIN
3003 W. Hopkins Street
Milwaukee 16,

CANADA
1215 Greene Avenue
Montreal,
200 Fairbank Avenue
Toronto 10,
2845 Grandview Highway
Vancouver,

EXPORT
9th Floor Woolworth Bldg.
New York 7, New York

ARCHER • DANIELS • MIDLAND COMPANY

FOUNDRY PRODUCTS DIVISION • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Sizzling sand poured on rubber

A typical example of B.F.Goodrich improvement in rubber

STEAMING hot sand, from molds used to make steel castings, is dumped on this belt every few minutes.

Ordinary belts stood the sizzling sand for only 30 days. A belt made of woven asbestos lived a short, simmering life of 60 days. But even during this brief life, the belt had to have "first aid" every week — a dressing to protect it from the heat.

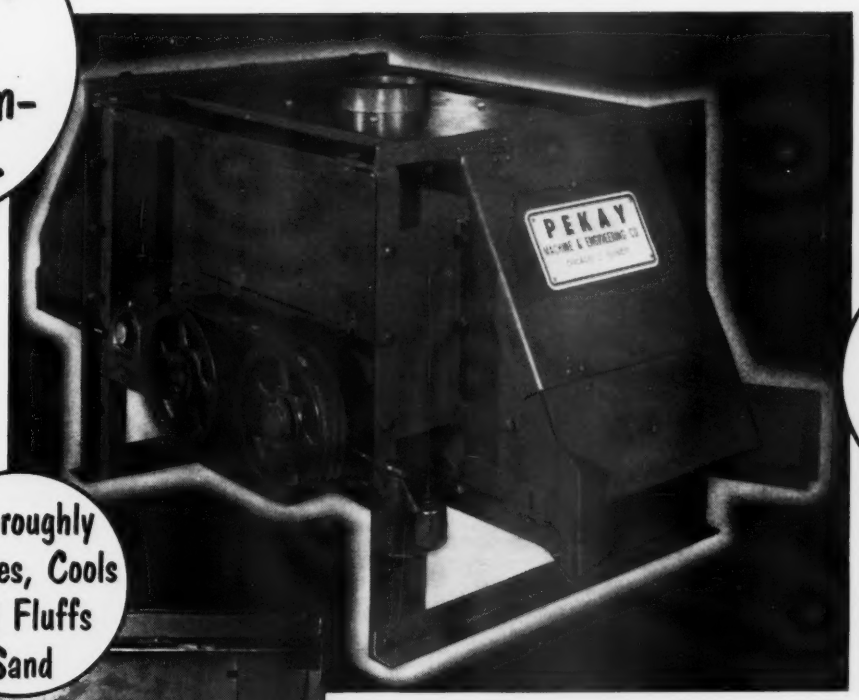
The company was far from satisfied. They asked about rubber, but every salesman said it couldn't stand the terrific heat. Every salesman, that is, but one.

A B. F. Goodrich man told them that his company had developed a special heat-resisting rubber for belts carrying such things as hot sand, lime, nitrates. Instead of ordinary fabric, they used *glass* fabric to make a belt that can stand heat as high as 500° F. Put to work here, the BFG belt outlasted all previous belts. It performed for two years — a ripe old age for a belt in a busy foundry that works 24 hours a day, 7 days a week.

New and improved products, like this hot material belt, are the result of the B. F. Goodrich emphasis on research — finding better and more economical ways of getting things done with industrial rubber products. That's why it pays to keep in touch with your BFG distributor for the latest ways to save with rubber. *The B. F. Goodrich Company, Dept. M-141, Akron, Ohio.*

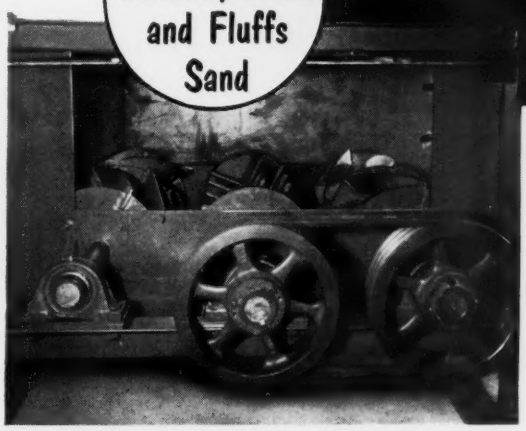
B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

Cuts Scrap Loss.. Saves Maintenance..



Stops Lump Trouble..

Thoroughly Aerates, Cools and Fluffs Sand



PEKAY AIRATOR

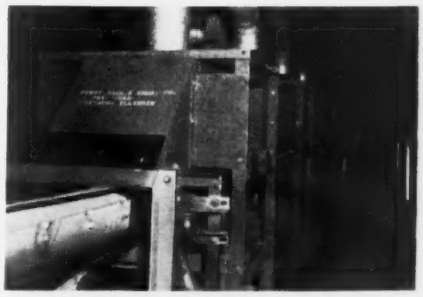
Here's a simple, efficient way to get the profitable production advantages of easy-flowing sand. The soundly engineered PEKAY Airator gives you *total availability* of your production lines at all times. It can't clog or choke up; and protracted line shutdowns are never necessary, even during occasional maintenance work. Parts changing requires no cutting up of equipment.

In day-in, day-out use, PEKAY Airators are cutting scrap losses and reducing machining time for foundries throughout the country. It will cost you surprisingly little to gain these same benefits.

The PEKAY Airator is a sturdily built but very compact unit. It's approximately 2′ high (above belt): 6½′ long; weighs 800 lbs. You can see the 2 aerating cutter wheels and the aerating fluffing wheel in the picture above (which also shows how easy it is to get at all functioning parts of the unit). These wheels thoroughly *aerate* and *cool* the sand carried directly into the Airator by belt conveyor. Capacity of the unit is practically unlimited.

Remember—with the PEKAY AIRATOR, maintenance is exceptionally simple. Even complete wheel replacement takes only about 2 hours or less, with no blow-torching needed.

Here's another PEKAY development for more efficient, lower-cost foundry sand-conditioning. Units now in use are mulling better sand, with half the bonding material, at a volume increase per hour up to 85%!



PEKAY *Mixer-Muller*

SEND FOR COMPLETE DETAILS, PRICES, TODAY!

Specialists in Foundry Sand-Handling Engineering & Equipment

PEKAY MACHINE & ENGINEERING CO.

871 N. SANGAMON STREET CHICAGO 22, ILLINOIS

M-T-MATIC Elevator Conveyor Buckets
TROFF-O-MATIC Conveyors

Gentlemen:

Please send me details and price information on the PEKAY AIRATOR

NAME _____ TITLE _____

COMPANY _____

STREET & NO. _____ CITY _____ ZONE _____ STATE _____

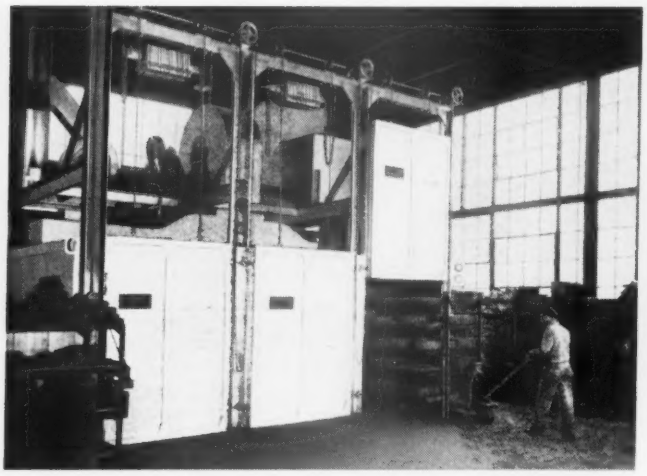
Outstanding performance of COLEMAN

Over 80% of Coleman Oven installations are repeat orders because experience has proved that these ovens provide "day in and day out" uniform baking of cores and molds at lowest cost. From their records, large production foundries and small shops throughout the country know that Coleman Ovens have increased casting production . . . reduced overhead . . . and produced greater profits.

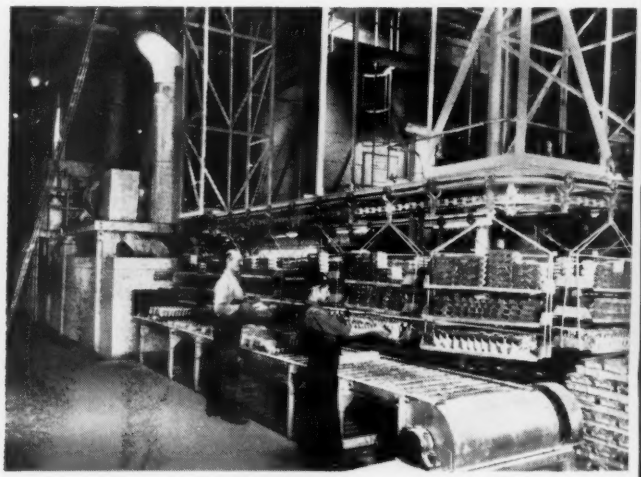
Coleman Core and Mold Ovens provide exclusive features resulting from 50 years of specialization in the design and construction of foundry ovens, and over 11,000 installations in leading foundries. As a result, Coleman Ovens give complete satisfaction on every core baking or mold drying job for which they are designed.

When you are considering a new oven installation it will pay you to consult with Coleman first. Our engineers are available, without obligation, to make practical recommendations for your particular requirements.

WRITE FOR BULLETIN D

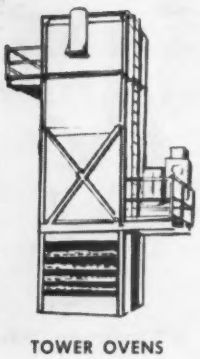


Coleman Transrack Core Ovens
at Crucible Steel Castings Company

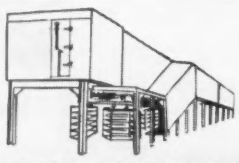


Coleman Horizontal Flight-Conveyor Redry Oven
at Ford Cleveland Foundry

A COMPLETE RANGE OF TYPES: COLEMAN OVENS are built in a complete range of sizes and capacities for every core-baking and mold drying requirement.

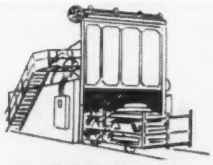


TOWER OVENS

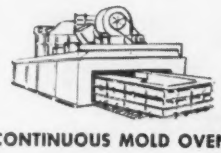


HORIZONTAL CONVEYOR OVENS

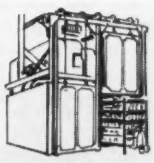
CONTINUOUS REDRY OVENS



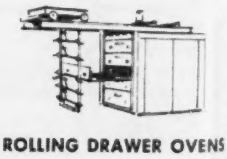
CAR-TYPE OVENS



CONTINUOUS MOLD OVENS



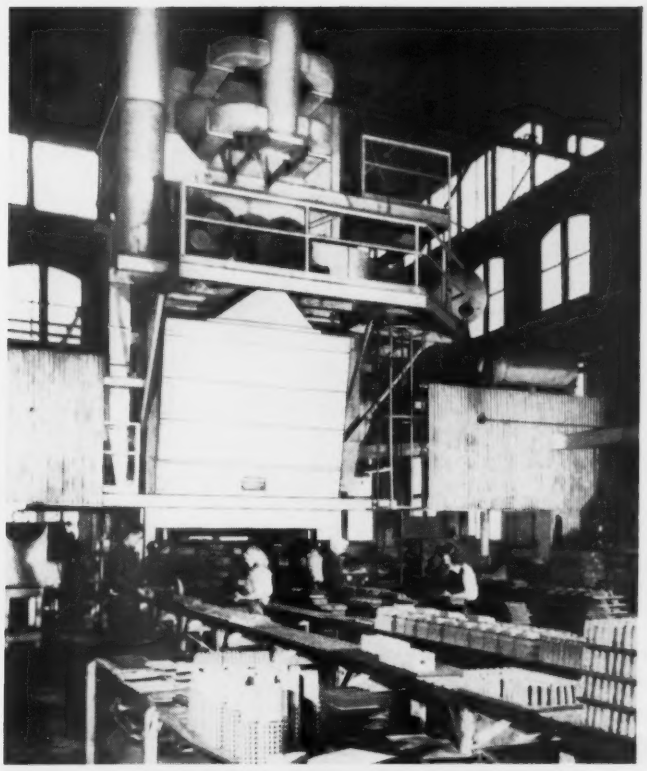
TRANSRACK OVENS



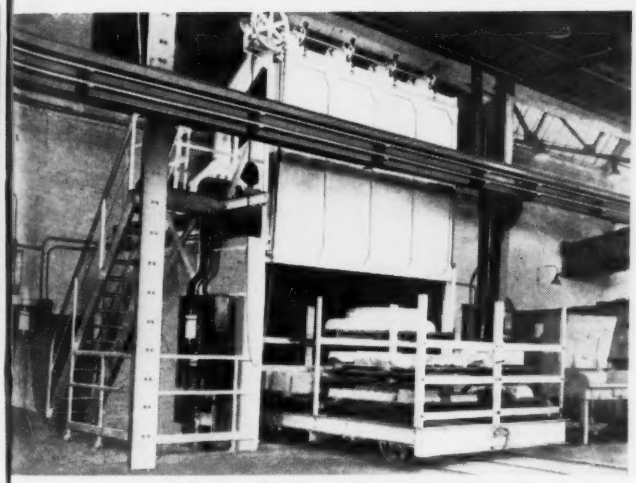
ROLLING DRAWER OVENS

OVENS

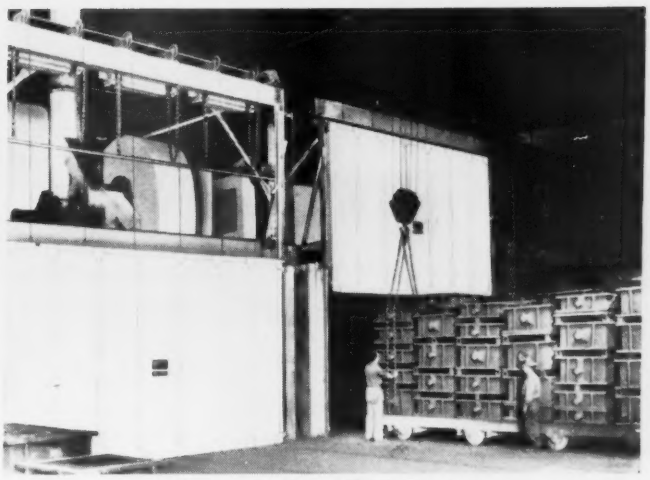
proved by repeat orders



Coleman Tower Oven
at Eastern Malleable Iron Company



Coleman Car-Type Core Oven
at Pettibone-Mulliken Corporation



Coleman Car-Type Mold Ovens
at Clark Brothers Company

Only Coleman Ovens offer all these advantages

MOST EFFICIENT HANDLING METHODS for your type of work and plant conditions . . . eliminate delays and losses.

PERFECT CORE BAKING ends manpower and casting losses due to make-overs and rejects.

PERFECT MOLD DRYING for true-to-pattern castings and easy cleaning.

INCREASED PRODUCTION by making the most efficient use of skilled and unskilled labor.

HEAVY DUTY CONSTRUCTION for continuous dependable performance, economical operation, and minimum maintenance cost.

BAKING AND DRYING TIME REDUCED regardless of size and shape of cores and molds, increasing turnover of plates, dryers, and flask equipment.

GREATEST SAVINGS IN FUEL by using the most economical fuel available.

SAVE BINDER. Proper core baking atmosphere and uniform temperature permit important savings in conventional binders.

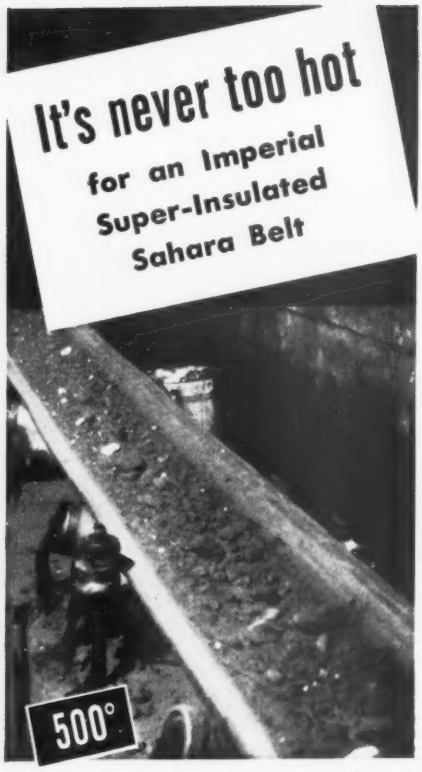
USE HIGH SPEED CORE BINDERS. Coleman Ovens have uniform temperature and accurate control to handle temperature-sensitive resins and pre-baked oils.

THE FOUNDRY EQUIPMENT COMPANY

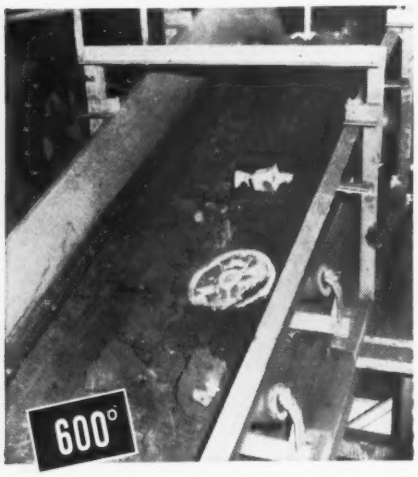
1821 COLUMBUS ROAD • CLEVELAND 13, OHIO

MEMBER FEMA

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS



At American Chain & Cable Co., this belt ran 24 hours a day, 5 days a week for over 2 years—handling hot shakeout sand with temperatures up to 500°. During this time production was accelerated and equipment operated at top speed.



$750 per hour shutdowns were eliminated by a farm implement company when they installed this belt to convey white-hot castings and knockout sand. Result: $30,000 saving in 12 months.

• • • • • •

Write for data sheet 47-8 and case histories on belts for handling hot materials.

Imperial BELTING CO.

1755 S. KILBOURN AVE., CHICAGO 23, ILL.

Engineered Belting—
The Right Belt for Each Job

With the Editors

MANY PAY TRIBUTE: Pat Dwyer, whose writings appeared in FOUNDRY for 35 years, left an imprint upon many of the foundry industry which will continue for years to come.

Some foundrymen found much of interest and value in the hundreds of technical articles that continued to flow from his typewriter from the time he first came down from Nova Scotia. Others secured entertainment and knowledge from the "Adventures of Bill' that broke all records in the field of business or general magazines for continuous appearance. Letters, phone calls and comments from those the editors have met during the past month tell of the friendship of foundrymen for this exceptional journalist.

I would like to quote from a few of the letters which have been received:

On behalf of the Officers and Trustees of the Foundry Educational Foundation, I want to express our deepest sympathy over the loss of your associate, Pat Dwyer. We at the Foundation, along with his many friends throughout the industry, share this loss of a personal friend. He will live in the memory of all foundrymen for many years to come.—E. J. Walsh, executive director, Cleveland.

* * *

I do not know how you are going to run FOUNDRY without Pat Dwyer. At least it is going to be a somewhat different kind of publication in any case. I can't think of any journal to which an individual has added so much color and good feeling for so long a period of years. Indeed, I sometimes feel that some of the technical and business publications make special effort to hide the personality of their staff of men. One of the best things about FOUNDRY is that this has not been the case.

I trust Pat will find a most comfortable berth in the next world, to which his efforts and good work should abundantly entitle him.—Dean C. J. Freund, University of Detroit, Detroit.

* * *

A former student living in East Cleveland has sent me a clipping recording the passing of my intimate friend, Pat Dwyer. This turn of events affects me profoundly, since Pat was a confidant, a counselor and a priceless friend to me.

In view of the irreparable loss that I feel, please let me commiserate with you since I am sure you will find that Pat's absence presents an irreparable situation.—Prof. Gilbert S. Schaller, University of Washington,

* * *

I knew Pat Dwyer for many years, as have thousands of others in the foundry business. He was certainly a very engaging character. His keen sense of humor, and his blithe disposition constituted one of the brightest spots in a rather drab field of industry. Peace to his ashes.—David Evans, chairman, Chicago Steel Foundry Co., Chicago.

* * *

I have known Pat Dwyer a long time and have liked him as long as I have known him. A convention or even a large conference without Pat just won't seem the same. All of us who knew Pat have lost a lot.—Tom E. Barlow, sales manager, Eastern Clay Products Department of International Minerals & Chemical Corp., Chicago.

* * *

Pat Dwyer was a grand little chap and with his whimsical manner made friends wherever he went. Everyone knew and admired him.—Thomas Kaveny Jr., president, Herman Pneumatic Machine Co., Pittsburgh.

* * *

I know that your organization will miss Pat Dwyer, as will the industry.—George K. Dreher, Waukesha Foundry Co., Waukesha, Wis.

* * *

For many years, Pat Dwyer has been one of the landmarks that I looked forward to seeing each year, for it was a pleasure to visit with him.—Ben D. Claffey, president, Acme Aluminum Alloys Inc., Dayton, O.

* * *

Pat Dwyer was a grand fellow and a great asset to the foundry industry. —Robert E. Kennedy, formerly executive secretary, American Foundrymen's Society, Wilmette, Ill.

* * *

Of Pat it may be said his personality was one with which few are blessed. There never will be another Pat Dwyer.—Francis T. O'Hare, president, O'Hare's Foundry Co., St. Louis.

* * *

One could not have his office next to Pat's for several years without coming to know him, appreciate him, and admire him. When I think of his many "Adventures of Bill," and his constant fund of good humor, I realize that he really was an amazing individual. FOUNDRY has lost an edi-

(Concluded on page 12)

CONTROL !

ONLY CRUCIBLE MELTING GIVES THE CLOSE CONTROL OF FURNACE ATMOSPHERE SO ESSENTIAL TO MEET MODERN METALLURGICAL REQUIREMENTS.

CRUCIBLE MELTING

Universal Castings Corp., Chicago, Illinois
8 Crucible furnaces, No. 70 Crucibles, oil fuel.

Desirable melting requirements can be met best with Crucible furnaces; for example, Crucible furnaces, operated with a slightly oxidizing atmosphere, produce the results indicated in the fourth A.F.S. Foundation Lecture—"the best melt qualities were obtained by exposing the melt to oxidation."

CRUCIBLES FOR CONTROL

CRUCIBLE MANUFACTURERS ASSOCIATION

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VESUVIUS CRUCIBLE CO.	ELECTRO REFRACTORIES & ABRASIVES CO.	ROSS-TACONY CRUCIBLE CO.

A Modern Installation of Mathews Foundry Conveyers

however it must be handled

by GRAVITY

In foundries everywhere, Mathews Roller Conveyers are standard equipment. They are designed by people who know foundry conveying problems. *They are built to stay on the job.*

or POWER

Trolley, live roller, pallet and drag chain—they are all part of the complete Mathews line of power conveyers engineered for *foundry* service.

. . . there are MATHEWS CONVEYERS to do the job the way it should be done

Cores are handled smoothly, safely, on Mathews Trolley Conveyers

MATHEWS CONVEYERS

GENERAL OFFICES . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

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CANADIAN DIVISION . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

(*Concluded from page* 10)

tor who will be difficult to replace in the minds and hearts of thousands of foundrymen throughout the country. —Norman F. Hindle, professor and head, Mechanical Engineering Department, University of Idaho, Moscow, Idaho and formerly on the editorial staff of FOUNDRY.

* * *

Pat Dwyer was a remarkable character in many ways. His sense of humor was hard to match. The boys on FOUNDRY will miss him, and so will his thousands of readers.—J. D. Pease, Mount Dora, Fla., and former vice president of Penton Publishing Co.

* * *

Yes, both FOUNDRY and the industry will miss the friendship and writings of this talented Irishman. As this issue goes to press, there is a feeling that something is missing, and so there is, for this is the first issue for any of the editors that does not carry a "Bill" story.

He lived a full and enjoyable life, and contributed greatly to the field of castings. All of us have gained much from knowing and working with him over these many years.

* * *

Award for Nixon: National Business Publications, an organization of business magazines including FOUNDRY, staged a "State of the Nation Dinner" at Washington on Jan. 19. A

feature of the dinner was the presentation of the annual Silver Quill Award to Vice President Richard M. Nixon for distinguished service to the American people and to business and industry during his recent around the world tour. The vice president certainly did an excellent job in accepting the award, and in describing some of the highlights of the trip. The accompanying illustration shows the vice president at the left, Mrs. Nixon and Harvey Conover, president of NBP, who made the presentation.

* * *

Spring: In Cleveland it will bring the AFS Foundry Convention and Exhibition. Hope you are planning to attend the affair, which promises to be one of the best. F.G.S.

Now!

B&W SMOOTHSET

Available in Dry Form

Here's the mortar refractories masons asked for—and it's as easy to use with insulating firebrick as the popular wet B&W Smoothset because it has the same high water retention.

This property is important because the highly porous structure of insulating firebrick draws the moisture rapidly from the mortar, thus allowing too short a time for proper placing and setting of the brick before most mortars become unworkable.

Besides high water retention, the new dry B&W Smoothset can be stored indefinitely in a dry place without hardening—a big advantage on large jobs when refractories are installed over a long period of time.

In addition to helping you select the most economical refractories, your local B&W Refractories Engineer will be glad to help you select the best mortar for your installation. Next time you build or reline your furnace, get the benefit of his long experience.

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B&W REFRACTORIES PRODUCTS—**B&W Allmul Firebrick** • **B&W 80 Firebrick** • **B&W Junior Firebrick** • **B&W Insulating Firebrick** **B&W Refractory Castables, Plastics and Mortars** • OTHER **B&W PRODUCTS**—Stationary & Marine Boilers and Component Equipment... **Chemical Recovery Units** . . . **Seamless & Welded Tubes** . . . **Pulverizers** . . . **Fuel** Burning Equipment . . . Pressure Vessels . . . Alloy Castings

Make Their Own Foundry Patterns

FASTER—AT FAR LOWER COST
with Rockwell-built
DELTA POWER TOOLS

"With DELTA Power Tools, we're able to make our own patterns faster, and for less money, than by buying them on the outside," reports J. R. Wallace, pattern shop supervisor at Edward Valves, Inc., East Chicago, Indiana.

"DELTA Tools have helped tremendously in reducing our pattern cost. Their accuracy and flexibility have enabled us to meet production deadlines while holding tolerances as close as 1/64th of an inch."

"Delta's low price makes it possible for us to speed our work by purchasing two Deltas, rather than one large, expensive machine. . . . And there's practically no maintenance. These rugged machines never get out of alignment. As far as we're concerned, DELTA is the best industrial tool made." Of the 10 Delta-built tools in Edward Valves' pattern shop, several have been in daily use for more than 30 years!

Edward Valves is only one of hundreds of foundries cutting costs and improving production with DELTA Power Tools—not only in pattern making, but in finishing operations, too. For instance, DELTA Metal-Cutting Band Saws, Cut-off Machines, and Abrasive Finishing Machines provide unusual efficiency in casting header removal, deburring, and surface finishing.

Delta Power Tools can help YOU cut costs and improve production. Talk to your Delta Dealer today, he's listed in your telephone book under "Tools" or "Machinery," or send the coupon for complete catalog information.

This 20" band saw is one of ten Delta Tools in the pattern shop of Edward Valves, Inc. Operator N. H. Luecke is shown cutting out a small piece for a new valve pattern.

Operator Leroy Schmidt uses DELTA 12" Tilting Blade Saw to speed precision woodworking in the pattern shop at Edward Valves, Inc., which is equipped with 10 Delta-built tools.

Pattern maker drills the core box of a 10" piston pattern on a DELTA 17" Drill Press at Edward Valves, Inc. Tolerances are often held to 1/64".

DELTA QUALITY POWER TOOLS
Another Product by **Rockwell**

DELTA QUALITY MAKES THE DIFFERENCE

Delta Power Tool Div., Rockwell Manufacturing Co.
706C North Lexington Avenue, Pittsburgh 8, Pa.

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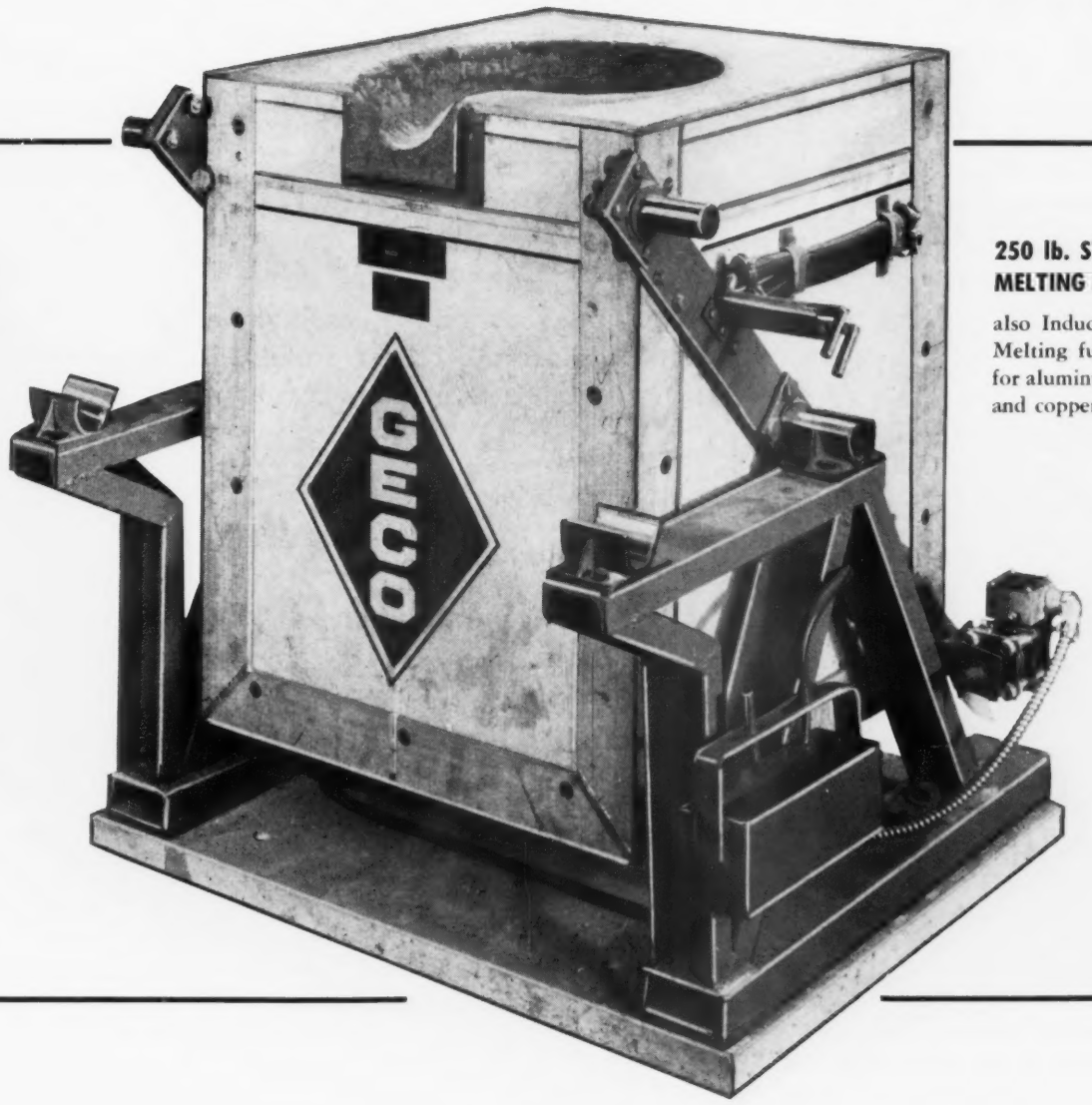
NEW In Conception and Economy

GECO Induction Melting



250 lb. STEEL MELTING FURNACE

also Induction Melting furnaces for aluminum, brass and copper.

Powered by our Rotary Frequency Converter resulting in lower initial investment.

PLUS . . . ALL THESE ADVANTAGES

1. Space saving.
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3. Product quality and shop working conditions greatly improved.
4. Labor reduction.
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DESIGNERS AND BUILDERS OF INDUSTRIAL FURNACES AND OVENS

CLEVELAND 17, OHIO *Associate Companies:* GENERAL ENGINEERING CO., LTD., TORONTO, CANADA
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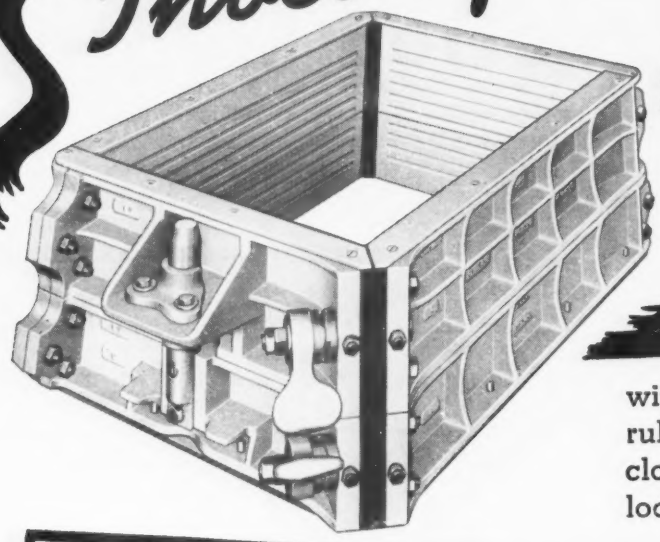
Investigate

the new

FREMONT SPREADLOCK FLASK



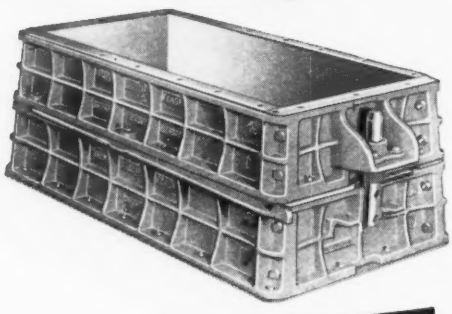
with the long-life, easily replaceable, live-rubber corner inserts which completely close the corner gaps so that no sand can lodge in the open corners.

PERFECT ALIGNMENT Indefinitely!

is guaranteed by the one-inch GROOV-LOCK FOOLPROOF PIN on

FREMONT STANDARD SLIP FLASKS

They are particularly adapted to cope or drag pattern jobs. Other types of standard pin fittings are also available. Solid, bolted and welded corner construction is a feature of Fremont Standard Slip Flasks.



Fremont Magnesium Flasks point the way to more exacting work. Accurately machined inside surfaces and flanges. Steel-faced top and bottom flanges. Magnesium has twice the tensile strength of aluminum, thus assuring longer service, and magnesium weighs 1/3 less than aluminum, making for easier handling.

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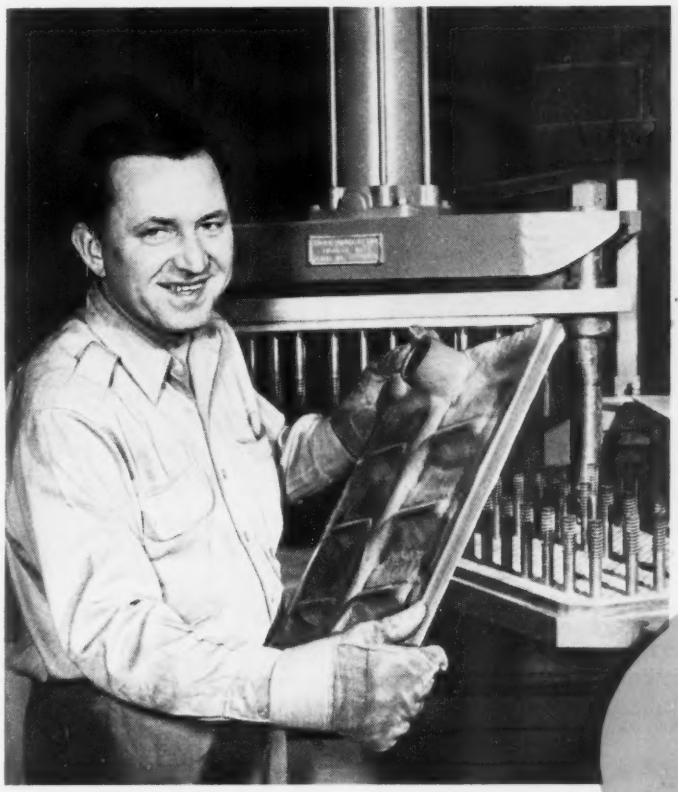
All orders given prompt attention.

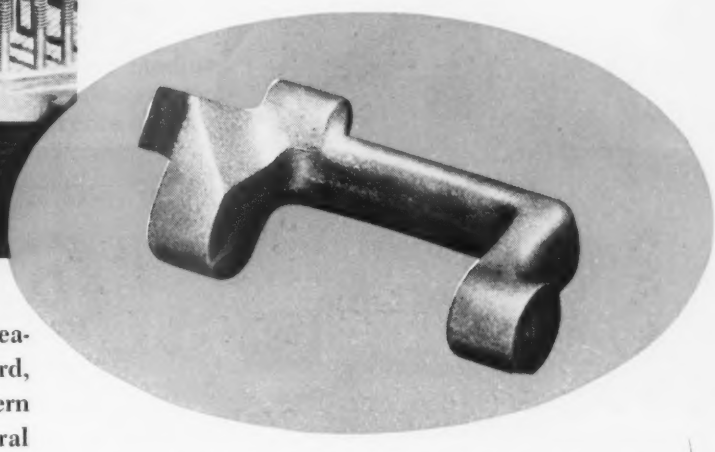
THE FREMONT FLASK COMPANY

FREMONT, OHIO

Here's how General Electric Shell Molding Resins and a new bonding machine CUT FINISHING COSTS UP TO 50%

CUT PRODUCTION TIME 56%





Reduced finishing costs up to 50% are being realized by Merrow Machine Company, Hartford, Conn., on yokes shell-molded by Production Pattern & Foundry Company, Chicopee, Mass. General Electric resins are used both to make the shell halves themselves and to seal them together on a new bonding machine, developed by Shell Process, Inc., which makes pouring without backup possible.

Merrow reports that the fine finish of the shell-molded castings reduces finishing costs up to 50%! Appearance is vastly superior to that obtained by conventional sand-casting methods.

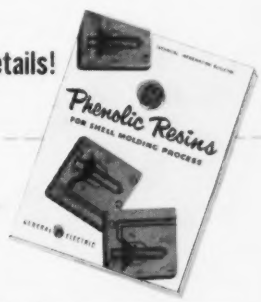
Production Pattern reports that fast-curing G-E shell resins on the molding machine and a special resin on the new bonding machine cut casting production time by 56%! A single operator can produce the shell halves and join them in a continuous cycle. G-E resins impart good hot rigidity to shells, resulting in low warpage, intimate sealing and close tolerances with low finning; high strength for good reproductivity and minimum metal reaction.

You can put your confidence in

GENERAL ELECTRIC

General Electric, makers of molding and bonding resins, as well as a silicone parting agent for the shell process, would like to tell you more about the cost-cutting possibilities of this new foundry technique. *Just mail the coupon for free samples and technical data!*

Send coupon today for more details!



General Electric Company
Section 418-1A, Chemical Division
Pittsfield, Massachusetts

Please send me:

Data	Sample	
( )	( )	G-E phenolic shell resin (medium cure)
( )	( )	G-E phenolic shell resin (fast cure)
( )	( )	SM-55 silicone parting agent

I want this for: ( ) Reference purposes only ( ) An immediate application on_____

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...and, brother that ain't hay

Whether your cores are for jobbing or production casting . . . are large or small . . . bulky or delicate . . . you will arrive at a high percentage of profit using foundry-proved Smith L-O Core Oil. And with 20 grades available, your production runs smoothly and efficiently because you select the *right oil* for the sand you use and the type of metal cast.

The incomparable quality and good results of Smith L-O arise from the meticulous attention given during compounding plus the recommendations passed on to our lab from our men in the field.

So look first to Smith L-O . . . the name that stands for a *service* as well as a *product.*

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MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
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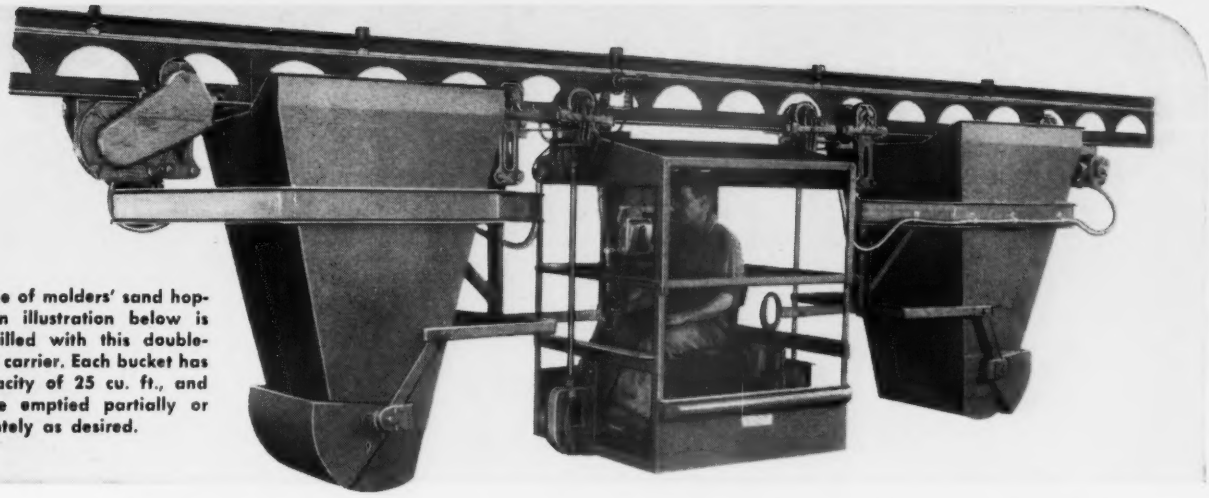


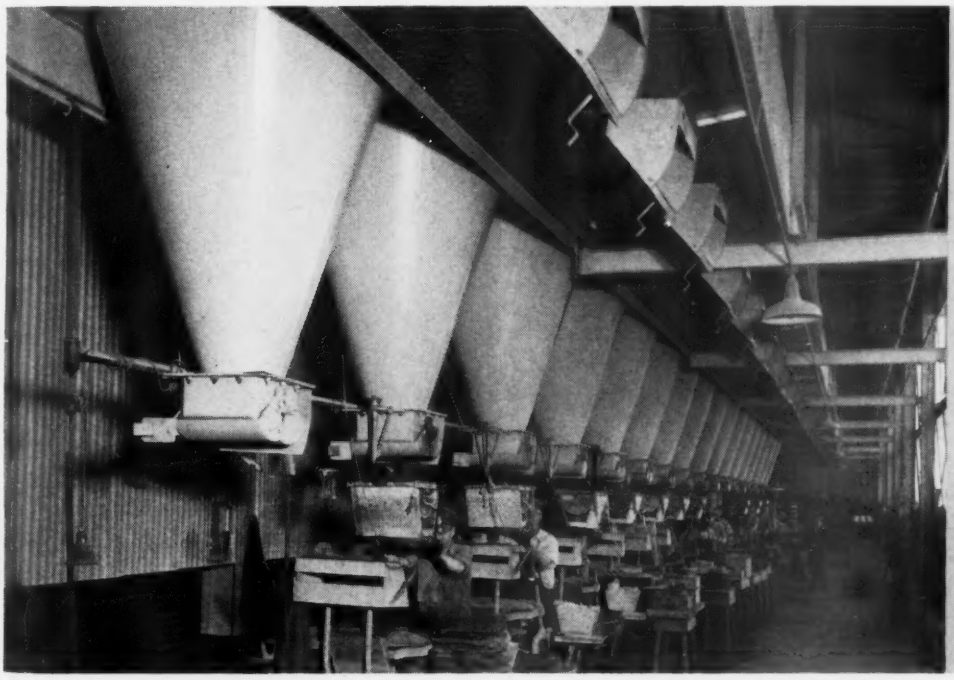
The line of molders' sand hoppers in illustration below is kept filled with this double-bucket carrier. Each bucket has a capacity of 25 cu. ft., and can be emptied partially or completely as desired.

Tramrail Bucket Carrier Speeds Sand to Molders

Do you have 10 or more molders? Do you produce large castings?

Then This Carrier Offers You Important Advantages

If your foundry is of medium or large size, either using a considerable volume of core or molding sand, or requiring sand distribution to a number of points, you should look into the possibilities of a Cleveland Tramrail cab-operated bucket carrier operating on overhead trackage. Consider these advantages:



1. High speed delivery from muller to molders.
2. One Tramrail unit serves many molders.
3. Greatly reduces sand spillage and aids cleanliness.
4. Sand carried in buckets does not lose its moisture content.
5. Easily adapted to foundry layouts of all types. Not confined to straight-line layouts.
6. Long track life is assured because tracks are high carbon with raised wearing treads.
7. Equipment has very few wheels and bearings to require attention.
8. Low overall maintenance.
9. Because of ease of erection or dismantling, Tramrail Systems are easily re-arranged or extended to suit new conditions as they arise.
10. Cost of equipment and operation usually lower than for other mechanized methods.
11. Tried and proven for many years in many foundries.

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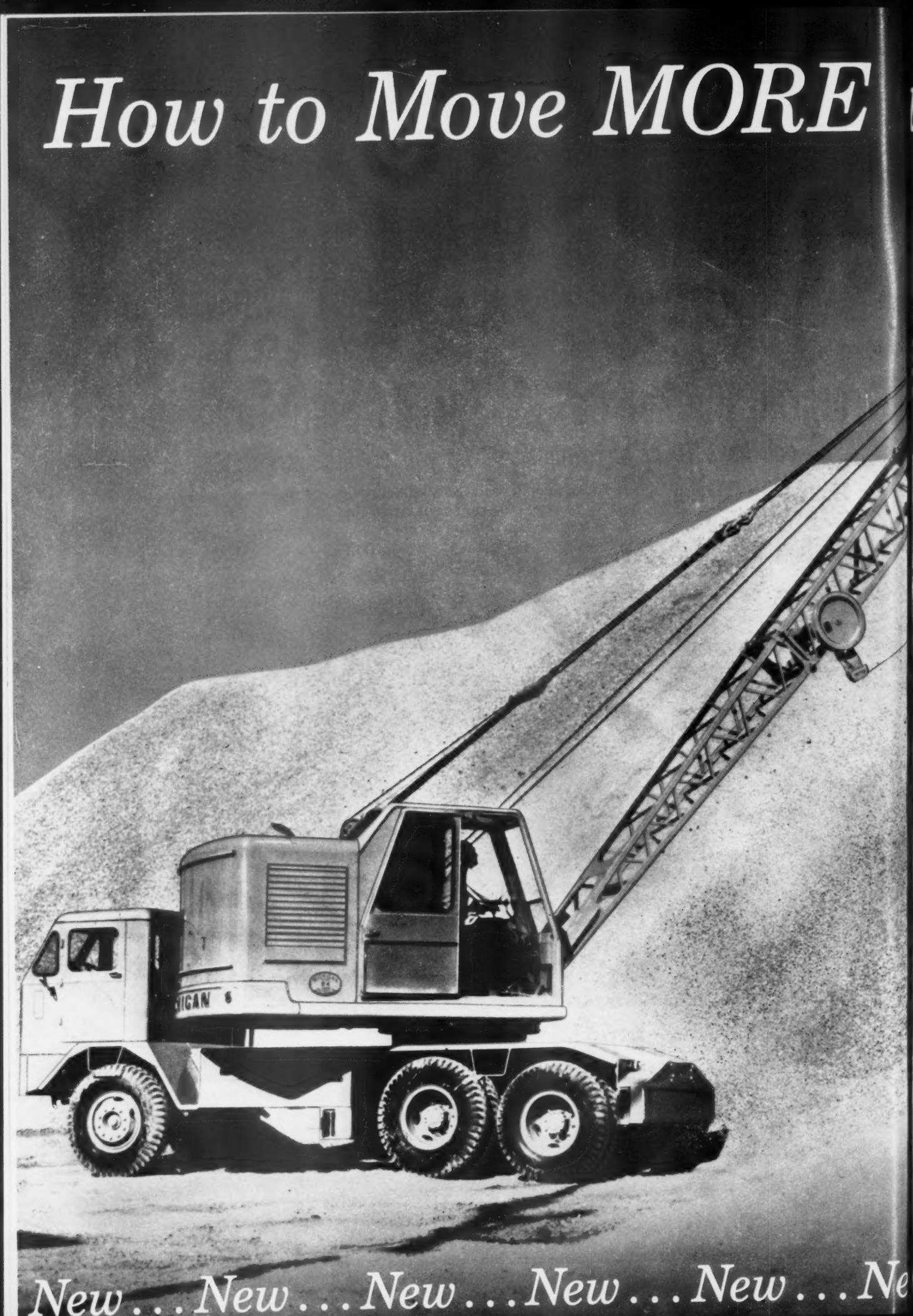
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

How to Move MORE



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MICHIGAN*...

in 3/4 yard bites!

CLARK EQUIPMENT COMPANY
presents the

MICHIGAN Series "24"

Model T-24 Truck, 6 x 4 and 6 x 6; Model C-24 Crawler Shovel, Clamshell, Crane, Dragline, Hoe

14 Reasons Why — the MICHIGAN Series "24" Is Your Best Buy in '54

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Primary Drive—power transmitted through two sets spiral bevel gears running in oil

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Swing Brake — air operated; standard equipment

Circle Gear Casting—large diameter double-flange one-piece steel casting

Hook Rollers—six 7½" diameter, tapered, adjustable; ball-bearing mounted

Cast Turntable — machinery deck with boom hinge pin bracket and hook roller brackets—single steel casting

Big Brakes—powerful hoist and crowd brakes, 30" diameter

Worm Gear Boom Hoist—independent high speed hoist with automatic safety brake—standard

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Crawler Base—one-piece cast steel carbody and circle gear; spring loaded safety brakes; 24" tracks standard

You'll find the MICHIGAN Fact-Folio handy and helpful; contains full specifications, an interesting book "Get More Yardage Through Air Power," and numerous action photos. The coupon will bring yours promptly.

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CLARK EQUIPMENT **Construction Machinery Division**

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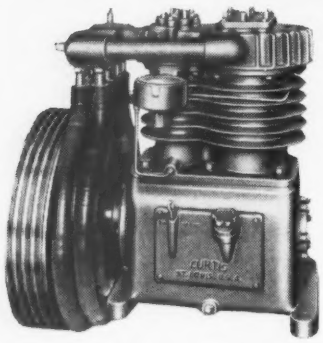

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TO LIFT, LOWER, PUSH, OR PULL *Curtis* Air Cylinders or Air Hoists Will Do The Job Quickly, Easily, and Economically — capacities up to 10 tons.

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Pendant Air Hoist...
ideal for any lifting or lowering application.

Bracketed Air Cylinder
can be mounted horizontally or vertically for lifting, lowering, pushing, or pulling.

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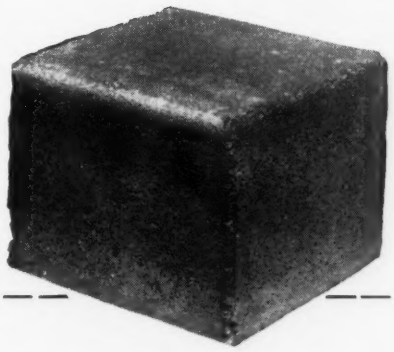
REDUCE MISRUNS by as much as 50%



Iron deoxidized with FERROCARBO® patented Briquettes is *more fluid* at casting temperatures than untreated iron. It flows more readily into thin sections or complicated molds. You get better castings...fewer misruns. Leading foundries report up to 50% reduction in misruns after using FERROCARBO in the charge.

Deoxidizing with FERROCARBO gives you additional advantages, too: Silicon recovery increases materially. You can charge more scrap—either steel or cast iron—since FERROCARBO reduces the chilling tendency.

The man who uses your castings benefits, too. The castings you supply him are finer-grained, denser, stronger...much easier to machine because they contain fewer segregations and chilled or hard spots.

FOR ALL THE FACTS, call your FERROCARBO Distributor today. Or write for the free booklet, "Producing Superior Gray Iron Castings." Address: The Carborundum Company, Dept. F 84-41, Niagara Falls, N. Y.

FERROCARBO DISTRIBUTORS:

KERCHNER, MARSHALL & CO.
PITTSBURGH • Cleveland • Buffalo
Philadelphia • Birmingham • Los Angeles

MILLER & COMPANY
CHICAGO • St. Louis • Cincinnati

WILLIAMS & WILSON
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• In Canada, "Carborundum" and "Ferrocarbo" are registered trademarks of Canadian Carborundum Company, Ltd., Niagara Falls, Ontario

FERROCARBO
REGISTERED TRADE MARK

by CARBORUNDUM
REGISTERED TRADE MARK

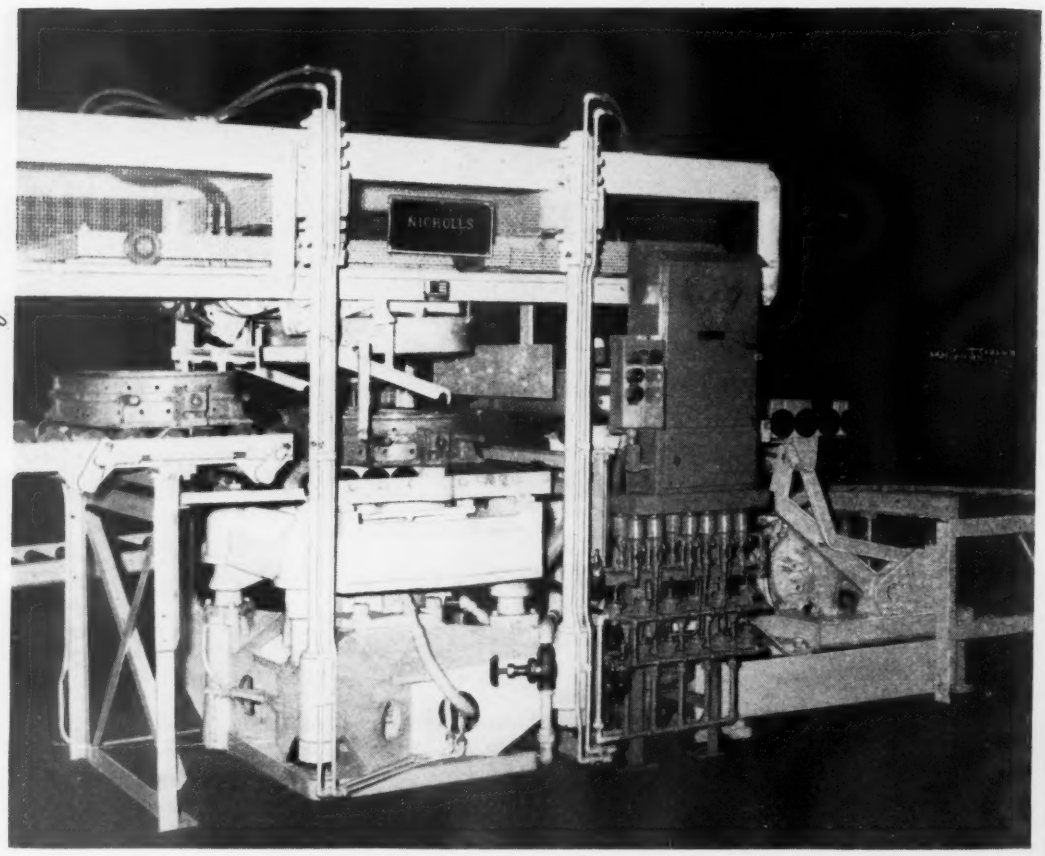
84-41

NICHOLLS

New Automatic "Push-Button" Molding Machine Is Simple and Economical To Operate

No. 21 Type C.F.—Jolt, Squeeze and Pattern Draw—Automatic-Push Button Control

(Also Made in Smaller and Larger Sizes)



From start to finished mold, the Nicholls #21 Type CF Jolt, Squeeze and Pattern Draw Molding Machine is push-button controlled to eliminate dangerous risks, costly mistakes—to give you better molds *continuously*. Precision built for long years of service... made with all the safety devices, the hidden "quality points" that reduce maintenance costs... the know-how that almost half a century of building quality molding machines has made possible. If you're interested in better quality molds at lower cost—investigate these machines now. *For complete information, write to:*

Wm. H. Nicholls Co., Inc., Richmond Hill 18, Long Island, N. Y.

NICHOLLS

"Cleans in five minutes what used to take us two days!"

says Reddin Iron Works about Pangborn Blastmaster® Barrel

Originally the Reddin Iron Works, Inc., Syracuse, N. Y., cleaned its castings in tumbling mills. But this method was slow, costly, and tended to wear off corners and edges of the castings. Today Reddin uses a Pangborn Blastmaster Barrel and finds it "better in every way" than previous methods. According to General Foreman Joe Fichera: "That new Pangborn Barrel is wonderful. It cleans in five minutes what used to take us two days."

Are *you* interested in cutting cleaning time? Are you interested in better, cheaper cleaning? Investigate the Pangborn Blastmaster Barrel which is available in 3, 6, 12, or 18 cu. ft. capacities. Pangborn recommends the use of Malleabrasive* with the Blastmaster Barrel for a finer finish in less time at less cost. For more details, write for Bulletin 223 to: PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Maryland.

PANGBORN'S 50th ANNIVERSARY—1904-1954

Pangborn

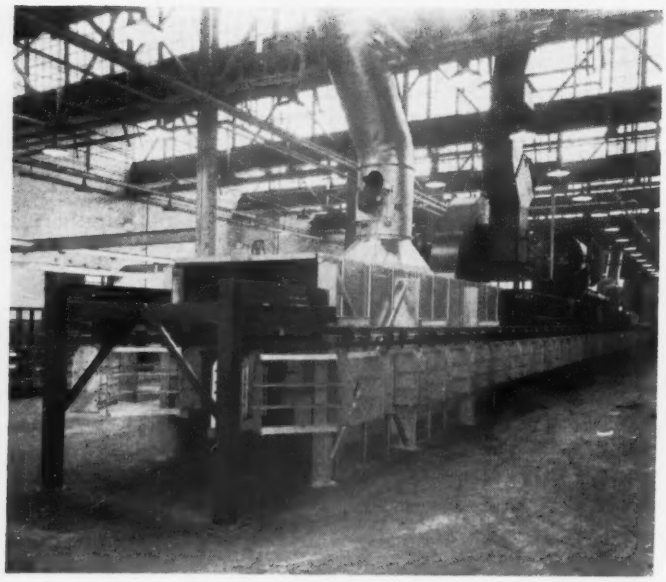
MEMBER FEMA

BLAST CLEANS CHEAPER
with the right equipment for every job

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment.

*U. S. Patent 2184926 (other patents pending)

Core Drying Ovens



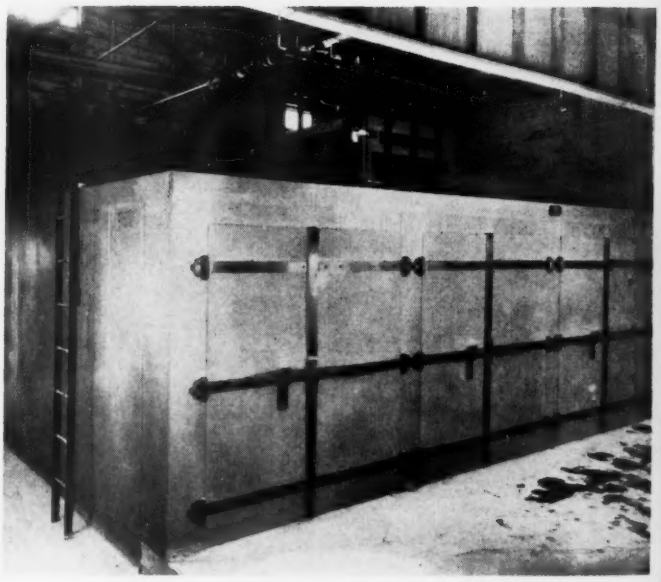
CONTINUOUS CONVEYORIZED CORE BAKING OVEN

The oven shown at left handles cores weighing from a few ounces to thirty pounds each. It has a production capacity of up to five thousand pounds per hour in a continuous loading, preheating and cooling cycle, providing uninterrupted flow of finished cores from makers benches to storage room.

IOI ENGINEERING VERSATILITY

BATCH TYPE CORE BAKING OVEN

Illustrated at right is a multi-compartment rack type batch oven. Cores on steel racks are loaded into the several compartments by lift trucks. Equipped with high volume air systems, with close temperature control in each section, it produces cores with high impact resistance and greater tensile strength.



Designers and Builders of Vertical, Multi-pass and Straight-through Conveyorized Ovens and Various Sizes of Batch Ovens

INDUSTRIAL IOI ENGINEERING VERSATILITY **OVENS, INC.**

13811 TRISKETT ROAD CLEVELAND 11, OHIO

LIGHT IN THE NIGHT...

Spearing across the snows
of Canada shines this headlight.
But for refractory brick,
the arc wouldn't spark to flash
the headlight, the stainless
steel with which the car is built
would not exist . . . the trucks
she rides on, the motors and the
generators, even the glass . . .
depend for their existence upon
quality refractories
such as Grefco supplies
the world.

Budd Rail Diesel Car on the
Canadian Pacific Railway

GENERAL REFRACTORIES COMPANY

GENERAL
REFRACTORIES
COMPANY
Philadelphia

Products of fame.. | wherever there's flame

Marietta

GREATEST NAME IN SILOS

'WAY OUT IN FRONT.... in research and development

MARIETTA continues to set the pace by maintaining a continuous research-engineering program, with a foundation derived from years of design and construction experience.

This program has resulted in the development of modern, efficient storage systems complete with design adaptability for every industrial storage need . . . capable of economically storing and handling all bulk materials.

You can depend on a MARIETTA storage system to eliminate waste and spoilage . . . to improve handling facilities . . . to build reserves and to lower operating costs. MARIETTA, the greatest name in farm and industrial silos.

Write for details today.
Catalog upon request.

A modern industrial storage system especially designed and erected by Marietta. Duquesne Light Co., Pittsburgh, Pa.

THE Marietta CONCRETE CORPORATION
MARIETTA, OHIO

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501 Fifth Ave., New York 17, N. Y.
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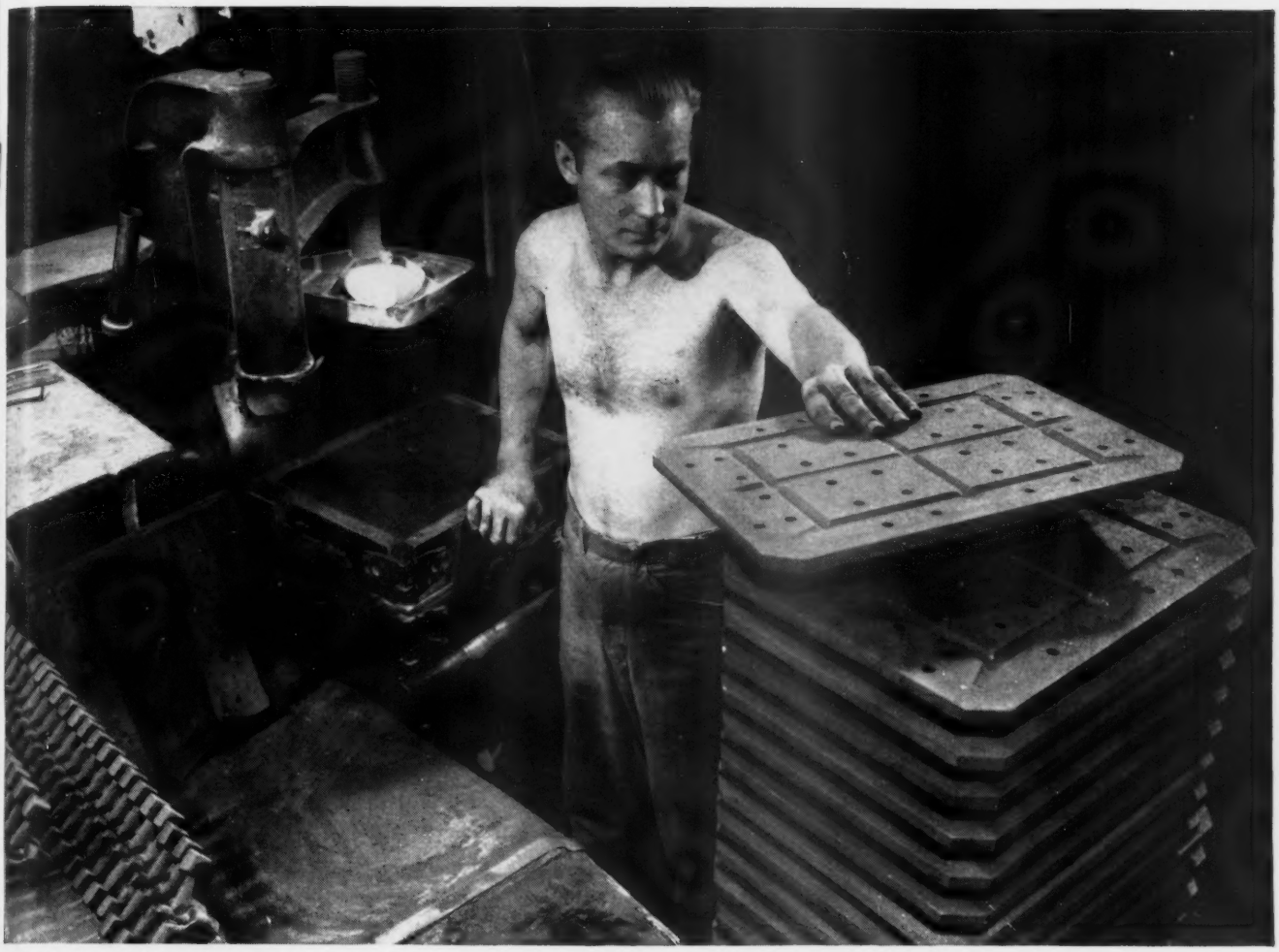
PRECAST CONCRETE PRODUCTS FOR FARM, HOME AND INDUSTRY



Molder at Louis Meskan Brass Foundry lifts Edco Dowmetal Bottom Board one-handed.

Notice how its bridge-type construction makes an Edco Board easy to handle, as well as providing resistance to warping and breaking.

"Our EDCO Dowmetal Bottom Boards have paid for themselves in one year...."

says EMMETT TORKELSON, Foundry Superintendent
LOUIS MESKAN BRASS FOUNDRY, INC., CHICAGO, ILLINOIS

"Every one of the 300 Edco Dowmetal Bottom Boards we bought a year ago is still in daily use," says Foundry Superintendent Torkelson. "Further," he says, "our Edco Boards have reduced our scrap loss by helping produce castings true to pattern.

"Edco Dowmetal Bottom Boards are easier to work with. Their design enabies the molder to roll the flask with greater ease than is possible with wood boards.

"We figure our Edco Dowmetal Bottom Boards have paid for themselves in one year. This is based on elimination of board repair and replacement, plus scrap savings, since switching from wood boards."

Louis Meskan Brass Foundry, Inc., is a medium-size foundry, casting nonferrous metals, including brass, bronze, copper and lead as well as aluminum.

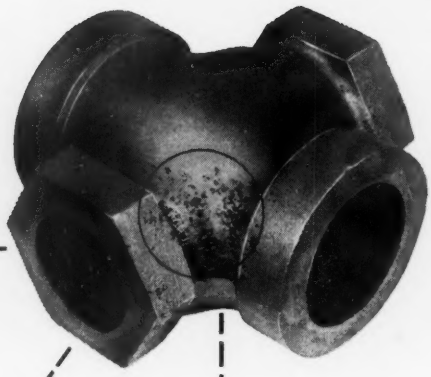
Whether your foundry is large, medium or small . . . whether you cast iron, steel or nonferrous metals . . . you will find it worth your while to look into Edco Dowmetal Bottom Boards. It's easy to get more information:

Simply write a letter or phone MAnsfield 6-7330 and we'll send you a price schedule and list of 83 standard sizes available from stock.

CHRISTIANSEN CORPORATION

210 SOUTH MARION STREET
OAK PARK 1, ILLINOIS
ALUMINUM ALLOY INGOTS

THERE IS A SOLUTION
TO YOUR COSTLY...
Foundry Problems--



Porosity

When you call upon
LAVIN'S ENGINEERING SERVICE

Porosity is one of many problems that confront the foundryman.

The evidences as well as the causes of this costly casting defect are numerous. Castings showing center line shrinkage result from pouring too hot. Large holes with a speck of dust in the bottom of each hole are caused by loose sand grains that are entrapped from pouring too cold. Evenly distributed clean bright holes throughout the entire casting are usually caused from excess hydrogen in the metal. Every foundry, at one time or another, encounters casting defects. They could be sand inclusions, shrinkage, slag or flux inclusions, gas porosity, blow holes or one of many others.

LAVIN'S metallurgical staff is always ready to assist the foundryman in finding the solution of any routine or special casting problem. Our chemical and research laboratories are available to you at no cost or obligation in order *to find the cause—to offer the remedy.*

Next time call upon LAVIN'S engineering service

"The Foundryman's Problems Are Our Problems"

FREE—WRITE FOR YOUR COPY OF THE 8 PAGE LAVINGOT TECHNICAL JOURNAL VOL. 9, NO. 4, CONTAINING A COMPLETE ARTICLE ENTITLED—"GATES & RISERS FOR MANGANESE BRONZE".

Brass · Aluminum · Bronze
Zinc Base Die Casting Alloys

R. LAVIN & SONS, INC.

- OFFICES—Boston, Pittsburgh, Cincinnati, Minneapolis, Philadelphia, Cleveland and Detroit
- WAREHOUSES—Boston, Philadelphia, Pittsburgh, Cleveland, Detroit, Minneapolis and Houston

3426 S. KEDZIE AVENUE • CHICAGO 23, ILLINOIS
REPRESENTATIVES IN PRINCIPAL CITIES

R. LAVIN & SONS INC. 1900 54 Years 1954 SERVING THE FOUNDRY INDUSTRY

• REFINERS OF BRASS, BRONZE AND ALUMINUM • PRODUCERS OF ZINC BASE DIE CASTING ALLOYS • DEOXIDIZERS... DEGASIFIERS....FLUXES... SHOT • CAST ELECTROLYTIC COPPER ANODES • TYPE METALS.

"FOUNDROMATIC" SHAKEOUTS

enough weight to VIBRATE

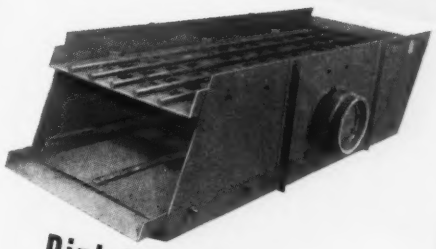
Underview shows why you get years of profitable service from a *Foundromatic* shakeout. The free-floating body includes lateral and longitudinal deck support members and sand hopper in a one-piece welded structure. Stress-relieving the entire unit after welding increases resistance to impact shock load.

The free-floating body of a *Foundromatic* shakeout — illustrated above — weighs more than 40% of shakeout capacity. You needn't worry about low weight ratio retarding shakeout operation with even the biggest castings. You don't have to buy extra capacity to get rapid shakeout.

Low maintenance is the result of its simple, rugged construction. For example, no mechanism shaft has ever broken during operation. Bearings are selected for extra-high service factor. Only one dust seal is needed because of the simple, two-bearing design. A specially designed pivoted motor base assures effective belt tension under all conditions of operation.

"Stopping bounce" has been eliminated too. The new exclusive* automatic snubber control brings the unit to a smooth, quiet stop. Mechanical snubbers — and their replacement — have been completely eliminated. Castings and flasks are not damaged by excessive throw.

*Patented



Ripl-Flo SCREENS

For breaking molding sand lumps — or other foundry screening jobs — you'll find *Ripl-Flo* screens save floor space and reduce maintenance because of their simple, two-bearing design. Write for Bulletin 07B6151.

You can get complete information from your nearby Allis-Chalmers district office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 07B6365B.

A-4257

Foundromatic and *Ripl-Flo* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

This recent Schneible Multi-Wash installation is typical of many such systems that are today helping management get that extra worker incentive necessary to produce more and better castings. A noticeable lift to output and employee relations has been the result of providing clean, healthful surroundings through efficient control of foundry fumes and dirt.

These 10 Multi-Wash units, having a total of 130 washing stages, remove the dirt from 350,000 cfm of air every minute. Water, at the rate of 1500 gallons per minute, is recirculated through the system to remove and convey the collected material to a central disposal tank, which also serves 40 other Multi-Wash units.

Schneible patents cover all features that make Multi-Wash the only dust collector using the wet method principle, that provides multiple washing action and an efficiency rating of 99.9%, by actual scientific tests.

PRODUCTS:
Water Curtain Cupola Collectors
Multi-Wash Collectors • Uni-Flo
Standard Hoods • Uni-Flo
Compensating Hoods • Uni-Flo
Fractionating Hoods • Ductwork •
Velocitrap • Dust Separators •
"Wear Proof" Centrifugal Slurry
Pumps • Settling and Dewatering
Tanks • Entrainment Separators

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 81, North End Station
Detroit 2, Michigan

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EUROPEAN LICENSEE: ELEX S. A., ZURICH, SWITZERLAND
CABLE ADDRESS FOR FOREIGN INQUIRIES: CBSCO

SCHNEIBLE

Late Foundry News

February 24, 1954

CONSTRUCTION ACTIVE: New construction put in place during January totaled more than $2.4 billion, 3 per cent ahead of January, 1953, according to preliminary estimates of the Department of Commerce and Department of Labor. Although this was a 9 per cent decline from December, activity was at near record levels after allowance for seasonal factors.

Private industrial building advanced contraseasonally in January, while most other major types of work showed the decline that is usual for the month. Private expenditures for new commercial, religious and educational buildings and for public utilities were at record levels for January, as also were public expenditures for schools, highways, and sewer and water construction.

FOUNDRY CLOSES: Sessions Foundry Co., Bristol, Conn., has quit its gray iron casting operations. The company, which would have reached its 75th anniversary on Mar. 25, occupied 12 buildings with 156,000 square feet of floor space and recently had 145 employees. Controlling interest in the business is held by the estate of the late Joseph B. Sessions.

NEW ALLOY FIRM: Acme Alloys Inc. has been organized at Philadelphia to manufacture white metal alloys, babbitt, solder and brass and bronze ingots. Officers are: President, Louis Mink, also president of the Mink Smelting & Refining Co.; treasurer, Humphrey Roper; secretary, Joseph Gross. The latter two formerly were with the Car-Mor Metal Co., recently bought by the North American Smelting Co., Wilmington, Del.

TITANIUM: Office of Defense Mobilization has established an interim expansion goal of 37,500 tons for titanium melting facilities capacity to be reached by 1956. Current capacity of the domestic industry is 7680 tons annually. The present four smelters plan expansion of 4200 tons per year which will result in output of at least 11,880 tons of ingots by 1956.

FOUNDRY EXPANSION: Certificates of necessity for rapid tax amortization have been issued by ODM to Warren Foundry & Pipe Corp., Phillipsburg, N. J., in the amount of $528,523 and to Reliance Steel Casting Co., Pittsburgh, for $87,201. ODM still is accepting applications for fast amortization of new or expanded facilities for production of steel castings and gray iron castings heavier than 3000 pounds.

Certain changes have been made in regulations governing issuance of certificates of necessity. One major change eliminates the so-called predetermination requirement. Under this provision, in the past some expansions were ineligible for rapid write-off if construction had been started before a certificate was issued. Another change is intended to take care of the taxpayer who expanded a facility after an expansion goal had been closed but later was reopened. Upon reopening, the taxpayer will be permitted to file within 30 days an application for a certificate of necessity on the expanded plant.

CUBAN NICKEL: National Lead Co. will carry out the expansion program which will increase the capacity of the government-owned nickel plant at Nicaro, Cuba, by 75 per cent. The company is major owner of Nickel Processing Corp., which is operating the existing plant. ODM is directing the expansion and has allocated $43 million to the project. The plant turned out 28 million pounds of nickel in 1953.

COPPER AMENDMENT: The government has relaxed further its controls over copper. An amended order reduces the percentages of copper and copper-base alloy products which producers are required to reserve to fill military and atomic energy rated orders. The set-aside for copper foundry products has been reduced from 27 per cent to 15 per cent.

FURNACE BUILDER SOLD: Salem-Brosius Inc. has bought the George J. Hagan Co. Both companies have headquarters in Pittsburgh and design and manufacture furnaces and heat treating equipment. Hagan will be operated as a wholly owned subsidiary. R. E. Talley is retiring as president of the latter, and President Ward A. Wickwire Jr. of Salem-Brosius will be president of both companies. Other personnel will be unchanged.

CAR DELIVERIES: Domestic freight car deliveries in January totaled 4944, against 4456 in December and 7981 a year ago. Orders placed by the railroads in January were for 2953 cars, bring-

ing backlogs of car builders on Feb. 1 to 27,959.

PERSONALS: Zigmond Madacey recently assistant foundry manager, Caterpillar Tractor Co., Peoria, Ill., has joined Beardsley & Piper Div. of Pettibone Mulliken Corp., Chicago, as field service manager . . . Clyde M. Adams, secretary, Bohn Aluminum & Brass Corp., Detroit, has been appointed deputy director, Aluminum-Magnesium Division, BDSA, Washington. On temporary duty, he succeeds Everett G. Fahlman, president, Permold Co., Medina, O. . . . F. J. Heaslip, vice president in charge of purchases and traffic for Fairbanks, Morse & Co., Chicago, is retiring Apr. 1. Donald L. Harwood has been appointed general purchasing agent . . . Wendell B. Barnes of Tulsa, Okla., has been made administrator of the Small Business Administration, Washington.

OBITUARIES: James A. Bowers, 49, for a number of years melting superintendent, American Cast Iron Pipe Co., Birmingham, died Feb. 13. . . . Leon M. Bristol, eastern representative of E. J. Woodison Co. and associated with the company the last nine years, died at Syracuse, N. Y., Feb. 17 . . . John J. McDevitt, 75, Milwaukee area representative for the S. Obermayer Co. for more than 50 years, died in Milwaukee, Feb. 15.

MISCELLANY: Miller Motor Co., Melrose Park, Ill., manufacturer of air and hydraulic cylinders, boosters and accumulators, has changed its name to Miller Fluid Power Co. . . . Eastern Clay Products Dept. of International Minerals & Chemical Corp. is expected to handle distribution of the diaphragm type molding machine developed by the Taccone Pneumatic Foundry Equipment Co., North East, Pa. . . . Jack Davis, former mayor of Reading, Pa., will be the speaker at the Mar. 19 dinner to be held during the Eastern Regional Foundry Conference in Philadelphia.

MAGNESIUM OFF: Production of primary magnesium in the United States last year totaled 93,075 tons, off about 12 per cent from 1952. Dow's Freeport, Tex., plant accounted for 32 per cent, the balance coming from six government-owned plants. Five of the latter ceased operations last June 30; the remaining plant at Velasco, Tex., is scheduled to continue operations.

PRICES OF FOUNDRY METALS AND COKE

(As of Feb. 24, 1954)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50–17.00
OVEN	
Birmingham	$22.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	23.50
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
Painesville, O.	25.50
Philadelphia	23.95
Portsmouth, O.	24.00
St. Louis	26.00
St. Paul	23.75
Swedeland, Pa.	23.85
Terre Haute, Ind.	24.05

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	63.00	63.50
Fontana, Calif.	62.50	....
Geneva, Utah	56.50	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	58.50	59.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	....	56.50

NONFERROUS INGOT

BRASS AND BRONZE: Red brass, No. 115, 23.50c; tin bronze, No. 225, 34.25, No. 245, 28.50; high-leaded tin bronze, No. 305, 27.75; No. 1 yellow, No. 405, 19.75; manganese bronze, No. 421, 24.25.

ALUMINUM: 99 per cent plus, primary ingots 21.50c. Secondary No. 12 alloy 18.25-19.00. Deoxidizing grades: No. 1 19.50-20.00; No. 4 15.50-17.00.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 29.50-30.00c, Connecticut valley.

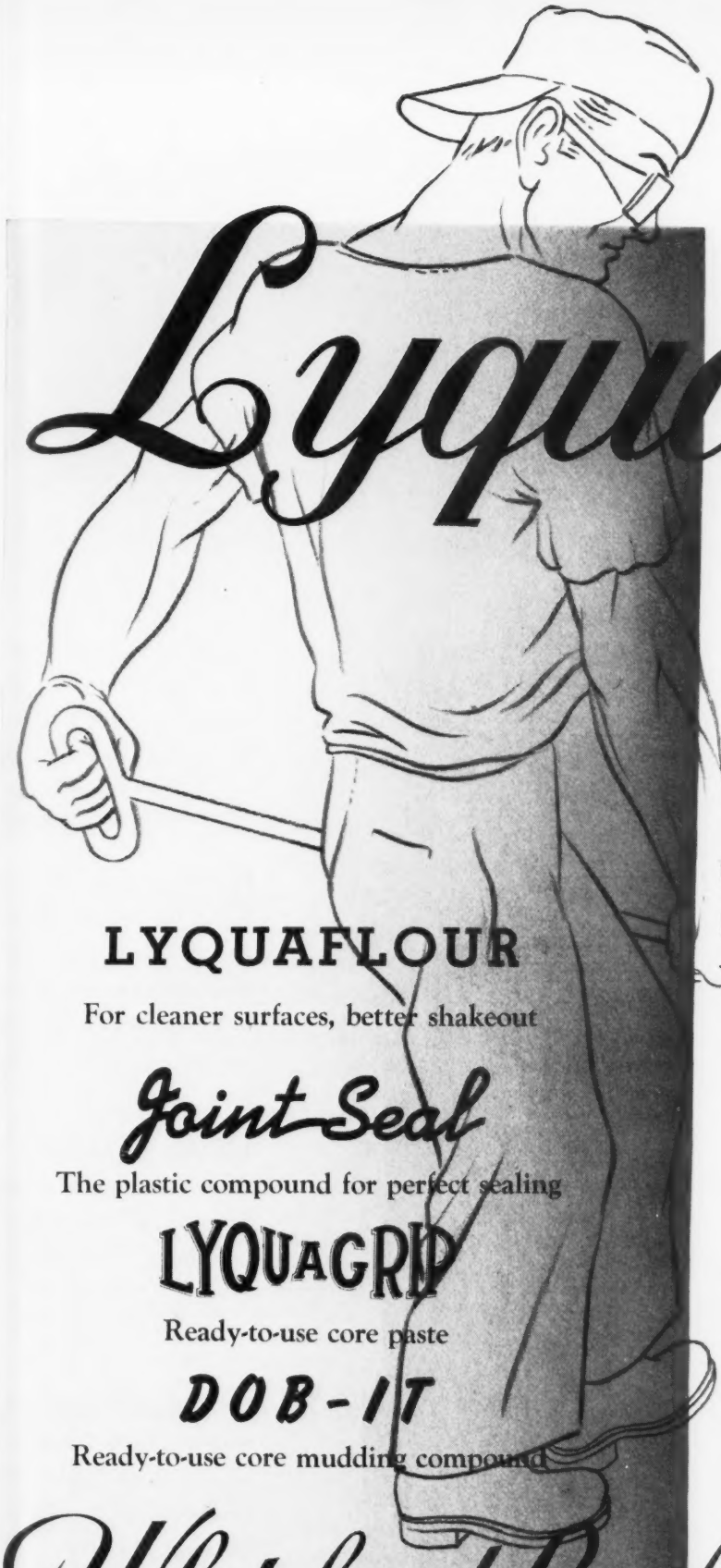
ZINC: High grade 10.60c, delivered. Die casting alloy 13.25, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$26.00–26.50	$41.00–42.50	$30.00–31.00	.....	.....	.....	$42.00–43.00
Boston*	**15.00–15.50	**29.00–30.00	.....	.....	**36.00–37.00	.....	.....
Buffalo	24.50–25.50	27.50–28.50	.....	.....	32.50–33.50	.....	36.50–37.50
Chicago	26.00–28.00	29.00–30.00	.....	34.00–35.00	33.00–35.00	37.00–38.00	39.00–40.00
Cincinnati*	**23.00–24.00	**37.00	**32.00	.....	**42.00	**33.00–34.00	**43.00–44.00
Cleveland	23.00–24.00	38.00–39.00	22.00–23.00	40.00–41.00	39.00–40.00	40.00–41.00	45.00–46.00
Detroit*	**18.00	**35.00	**25.00	**40.00	.....	**28.00	.....
Los Angeles	20.00	**35.00–38.00	.....	.....	.....	.....	.....
New York*	18.00	29.00–30.00	.....	.....	.....	.....	.....
Philadelphia	25.00	34.00–35.00	36.50–37.50	.....	40.00	.....	40.00
Pittsburgh	28.00–29.00	35.00–36.00	30.00–31.00	.....	42.00–43.00	.....	44.00–45.00
St. Louis*	25.00	37.00	25.00	37.00	.....	.....	38.00
San Francisco	20.00	39.00	36.00	39.00	43.00	.....	.....
Seattle	25.00	**35.00–37.00	**25.00–32.00	.....	.....	.....	.....

* Brokers' buying prices. ** F.o.b. shipping point.

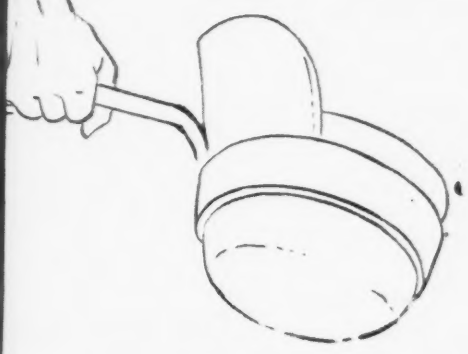


Established 1841

Lyquaface

Famous Liquid Carbonaceous Sand Grain Coating

1. **LYQUAFACE** is easy to use.
2. **LYQUAFACE** sand is not critical.
3. **LYQUAFACE** sand won't blow.
4. **LYQUAFACE** sand reduces gaggers and nails.
5. **LYQUAFACE** sand improves with use.
6. **LYQUAFACE** allows casting a carbon sheath.



7. **LYQUAFACE** provides hot strength.
8. **LYQUAFACE** provides tensile strength.
9. **LYQUAFACE** reduces casting weight.
10. **LYQUAFACE** improves finish.
11. **LYQUAFACE** reduces dust hazard.
12. **LYQUAFACE** reduces cleaning time.

You owe it to yourself to investigate our claims.—Send for detailed booklet.

LYQUAFLOUR

For cleaner surfaces, better shakeout

Joint-Seal

The plastic compound for perfect sealing

LYQUAGRIP

Ready-to-use core paste

DOB-IT

Ready-to-use core mudding compound

Whitehead Brothers Company

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence 1, R. I.

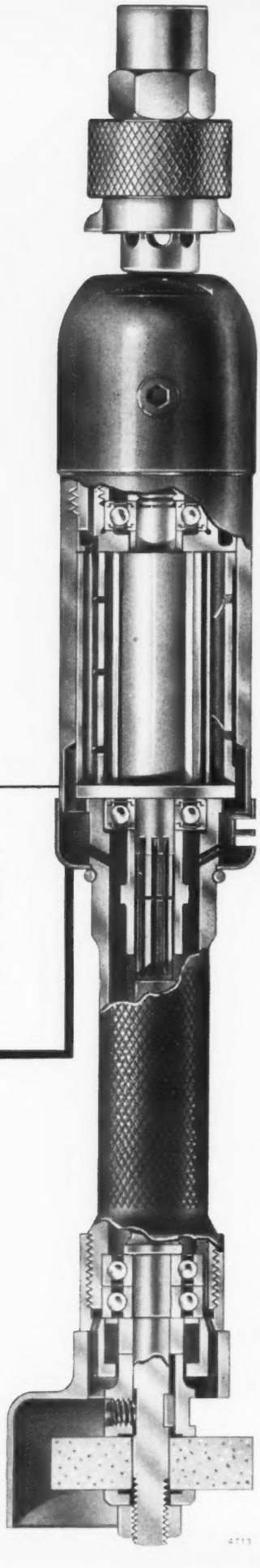
NEW!

CLECO

No. 14 GE—170

GRINDER

Featuring a new, more powerful motor, this tool is suitable for a host of applications including heavy duty die grinding and many foundry finishing jobs. It is fast, rugged, and maintenance-free — a real time and money saver.



Optional safety lever throttle

Optional thumb throttle

SPECIFICATIONS

Length	14¾ inches
Weight	5½ lbs.
Free motor speed	17,000 rpm
Size wheel	2 inch

Illustration shows the grinder equipped with Quick-As-Wink® Throttle. Other types of throttles are available if desired.

NEW: No. 14 motor is powerful enough to take heavy cuts without stalling, yet light enough for easy handling.

NEW: Splined coupling permits quick removal of grinding wheel shaft and bearing without disassembling the motor.

NEW: Air cooled precision bearings for cooler running and longer bearing life.

CLECO AIR TOOLS

CLECO

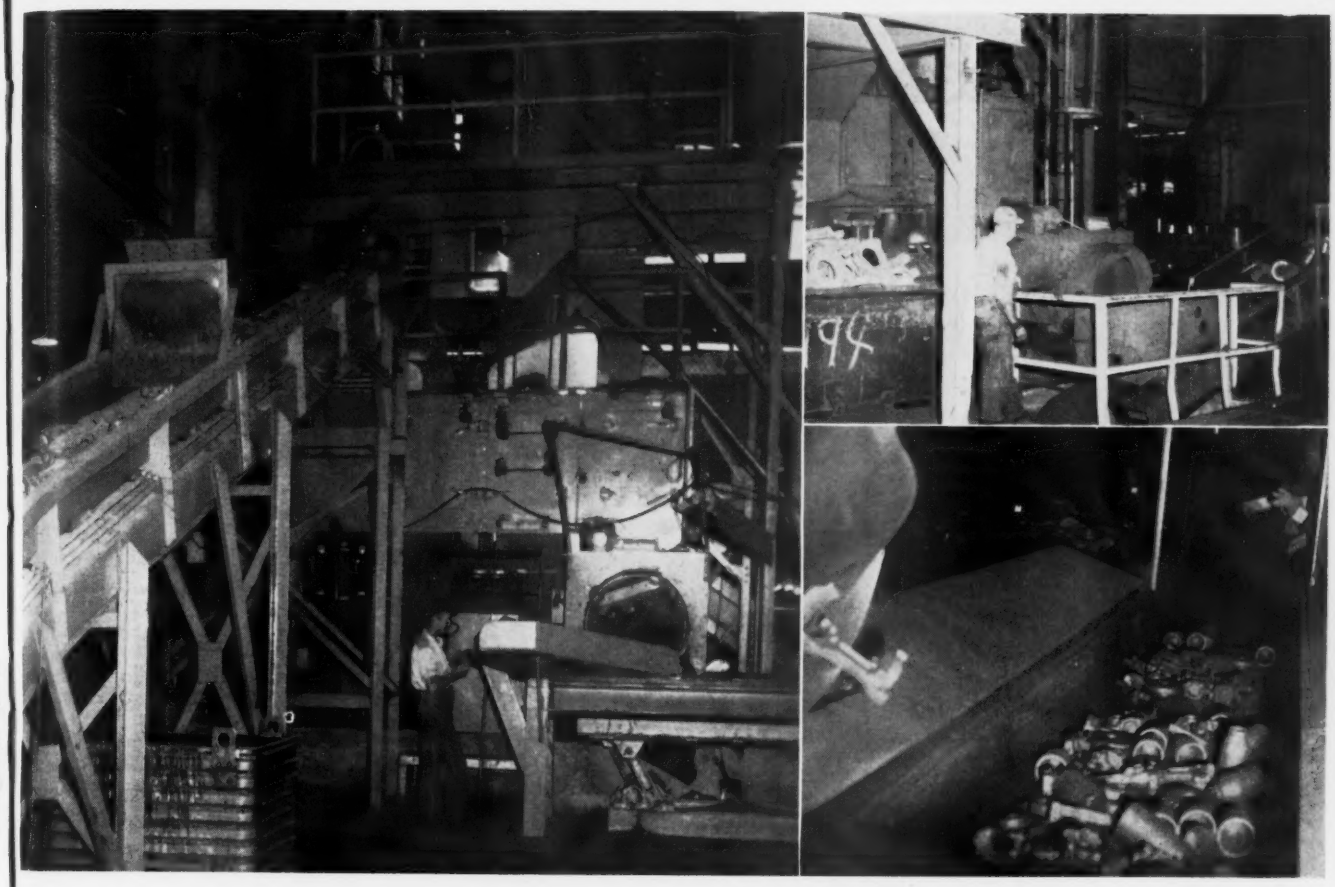
Division of REED ROLLER BIT COMPANY

AIR TOOLS AND ACCESSORIES

Grinders • Sanders • Rotary Drills • Riveters
Backfill Tampers • Chippers • Scaling Tools
Impact Wrenches • Screwdrivers • Sump Pumps
Paving Breakers • Spike Drivers • Air Line Accessories and Fittings

For a demonstration, write Cleco Division of the Reed Roller Bit Company, 5125 Clinton Drive, Houston 20, Texas. In Canada: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Toronto (Leaside), Ontario.

Pioneering Developments Keep **WHEELABRATOR**® *First in Blast Cleaning*



No operators needed . . . cleaning over 500 tons daily

Continuous, automatic cleaning achieved with three Continuous Wheelabrator Tumblasts.

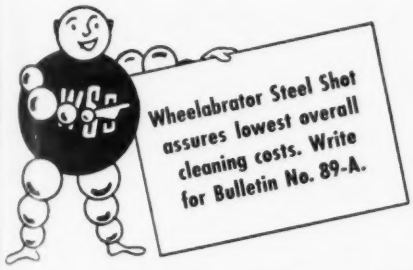
Automation . . . high speed automatic production . . . has spread to the cleaning room through the performance of Continuous Wheelabrator Tumblasts.

The midwestern gray iron and malleable foundries of a prominent automotive firm, for example, is achieving this highly-profitable, mass-production cleaning through use of three Continuous Wheelabrator Tumblasts. Operation of these units is completely automatic . . . conveyorized feeding and discharging of the work virtually eliminates the need for costly manual handling and machine operators.

Two of these high production machines are used for cleaning malleable castings at the combined rate of 25 tons hourly. In the gray iron foundry a similar unit cleans from 8 to 10 tons of miscellaneous castings hourly. Production rate of the cleaning machines is determined by the speed of the subsequent grinding, shearing and pressing operations. *American* pioneered the first continuous blast mill, and the sound engineering design and performance of this machine have been proved to the satisfaction of users in some of the nation's largest industries. At the Ford Cleveland Foundry, two of these units handle a combined tonnage of 20-24 tons per hour of gray iron castings.

Get the complete story!

Let us show you how one of these machines can be applied with cost-saving economy to your particular cleaning problem. One of our nearby field engineers will be glad to discuss this at your convenience. In the meantime write for literature.



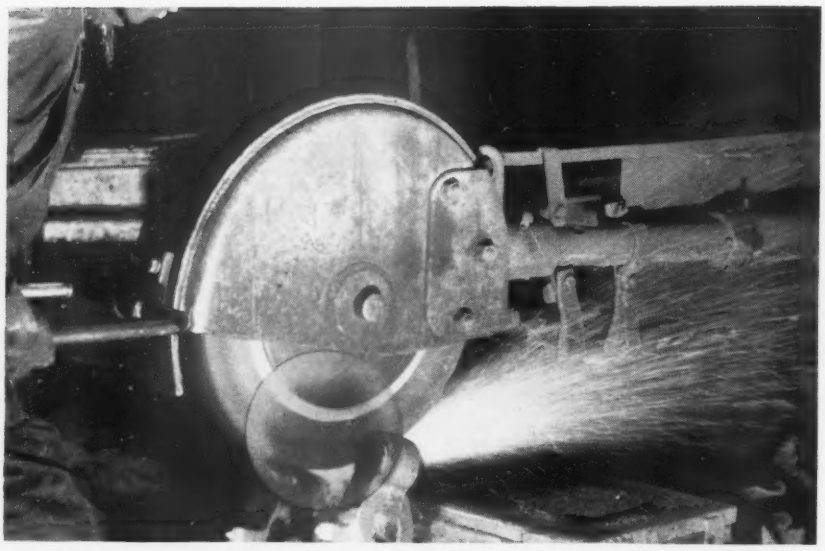
American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Ind.

Wheelabrator®
AIRLESS BLAST CLEANING

Manufacturers and Selling Agents: CONTINENTAL EUROPE—George Fischer, Ltd., Schaffhausen, Switzerland; BRITISH COMMONWEALTH—Tilghman's Patent Sand Blast Co. Ltd., Broadheath, England; JAPAN—Tokyo Boeki Kaisha, Tokyo; BRAZIL and ARGENTINA—Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; AUSTRALIA—McPherson's, Melbourne; MEXICO—Casco, S. De R. L., Mexico, D. F.

Brighten your rough grinding picture with this profit-boosting

"TOUCH of GOLD"



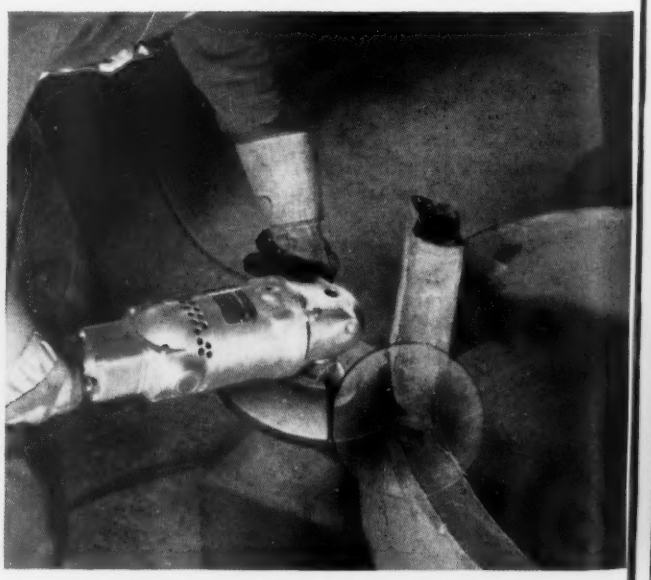
FOR YOUR SWING FRAME GRINDING, Norton wheels take heavy pressures and high speeds in stride. Their fast, clean-cutting action and extra long life assure more metal through your cleaning room per man-hour.

Profits from grinding actually begin with the first, most basic grinding operation — snagging. Yet the profit-potentials of rough grinding are apt to be more neglected than any other.

In your own rough grinding, Norton wheels can help bring every job up to its proper money-making level. Because you can get Norton wheels that are exactly right — in abrasive, in bond and in every other detail — for best results on all your jobs.

For proof, test Norton wheels against any others, under the same conditions. Your operators will like their easy-handling, clean-cutting action. And *you'll* like the way they grind off more metal per dollar, turn out better work and increase your production — bringing the real,

FOR YOUR BENCH AND FLOOR STAND GRINDING, Norton wheels combine exceptional cutting qualities with consistent wheel economy in a way that makes your grinding look good and your costs look better.



FOR MANY OTHER GRINDING JOBS, use Norton Nylon-Reinforced Hub Wheels — BD rigid and BFR semi-flexible. For work ranging from notching risers to weld finishing, they're the lightest, easiest, safest wheels made.

profit-boosting "Touch of Gold" to your rough grinding.

Your Norton Distributor

will gladly help you select the right wheels for your jobs and your machines. If necessary, he'll call your Norton Abrasive Engineer for expert advice on new or difficult applications. And with the world's broadest line to choose from, you'll get the wheels you need for better, lower cost grinding.

Booklet No. 1405 contains over 50 illustrated pages, covering every phase of rough grinding — including *your* jobs. Get it from your Norton Distributor. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

W-1541

NORTON

ABRASIVES

Making better products... to make other products better

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

FOR YOUR PORTABLE GRINDING, Norton wheels have the inbuilt balance that reduces vibration and bounce, and makes them "hug that work." Results are faster grinding, longer wheel life, less operator fatigue — advantages that show up in your profit column. Use Norton ALUNDUM* abrasive on steels and steel alloys, CRYSTOLON* abrasive on gray iron and non-ferrous metals.

FOR A *Quick* SURFACE-METAL SET . . .

DELTA Z-KOAT and Z-Z-KOAT

CORE AND MOLD WASHES

Contain ZIRCONIUM

DELTA Z-KOAT and Z-Z-KOAT Washes are easy to mix and easier to apply. After mixing, there is no danger of precipitation and, when dry, are completely moisture-proof. Applied by swabbing, dipping or brushing they adhere uniformly to the sand and produce smooth, highly-refractory surfaces.

Both DELTA Z-KOAT and Z-Z-KOAT Washes have unusually high fusion points and, because of their high heat conductivity, provide a more rapid surface-metal set. Both washes are economical to use.

DELTA Z-KOAT contains zirconium plus other high fusion refractories and DELTA Z-Z-KOAT is an all-zirconium type wash.

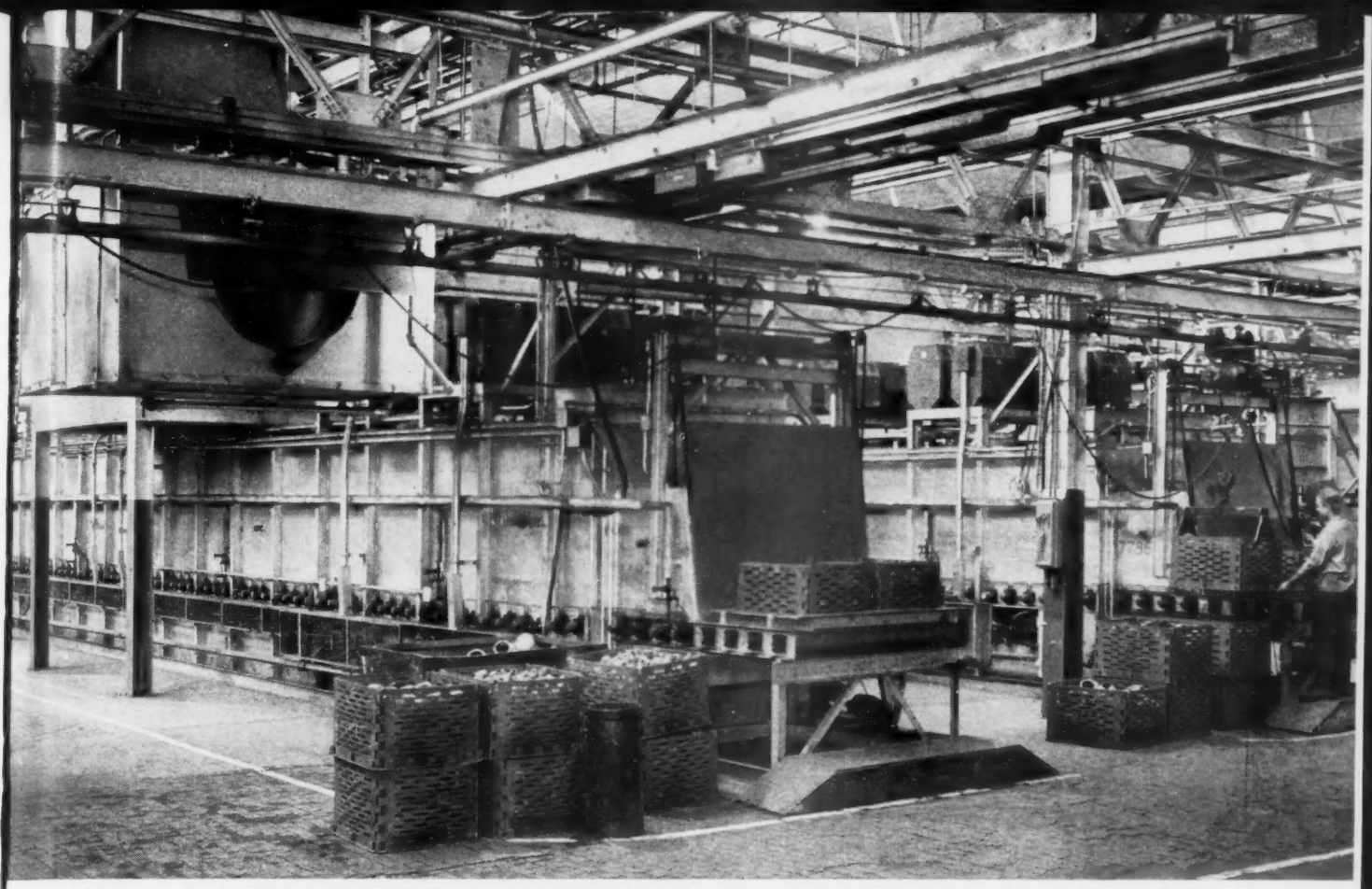
Working samples together with instructions available on request.

DELTA

OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS



MODERN MALLEABLE-IRON ANNEALING at its best is achieved in these G-E roller-hearth furnaces. Automatically controlled, both are easily operated by two men. Over 32 tons of low-cost, high-quality castings are processed in these furnaces every day.

Crane Co. Reduces Annealing Cycle 50%, Cuts Man-hours 40% with G-E Furnaces

Replaces Oil-fired Furnaces To Speed Production, Cut Costs

"We've shortened annealing cycles from 4 days to 48 hours, cut man-hours 40%, and sharply reduced maintenance costs by changing to G-E continuous furnaces for annealing malleable iron," says Harry Maack, Chief Metallurgist, Crane Co., Chicago.

With their old oil-burning furnaces, Crane had long annealing cycles and comparatively low production rates. Now, with their new system—including two G-E roller-hearth furnaces and control equipment—they process over 32 tons of castings every 24 hours.

G-E furnaces don't require expensive annealing pots as do fuel-fired furnaces because electric heat preserves the protective atmosphere given off by the castings. Simple, low-cost baskets are all that is needed. This reduces handling time and gives fast, uniform heating of castings. Straight-line, continuous annealing means that no time is wasted in waiting for the furnace to heat up or cool off as was necessary under the old system.

Crane's clean annealing setup has eliminated the discomfort of fumes, dust, and radiant heat. Low maintenance is assured because with durable G-E equipment, there are no products of combustion to cause furnace corrosion.

These extensive savings show how modern electric heat has revolutionized the malleable-iron industry. The first step in applying these benefits to your operation is to contact your nearest G-E Apparatus Sales representative.

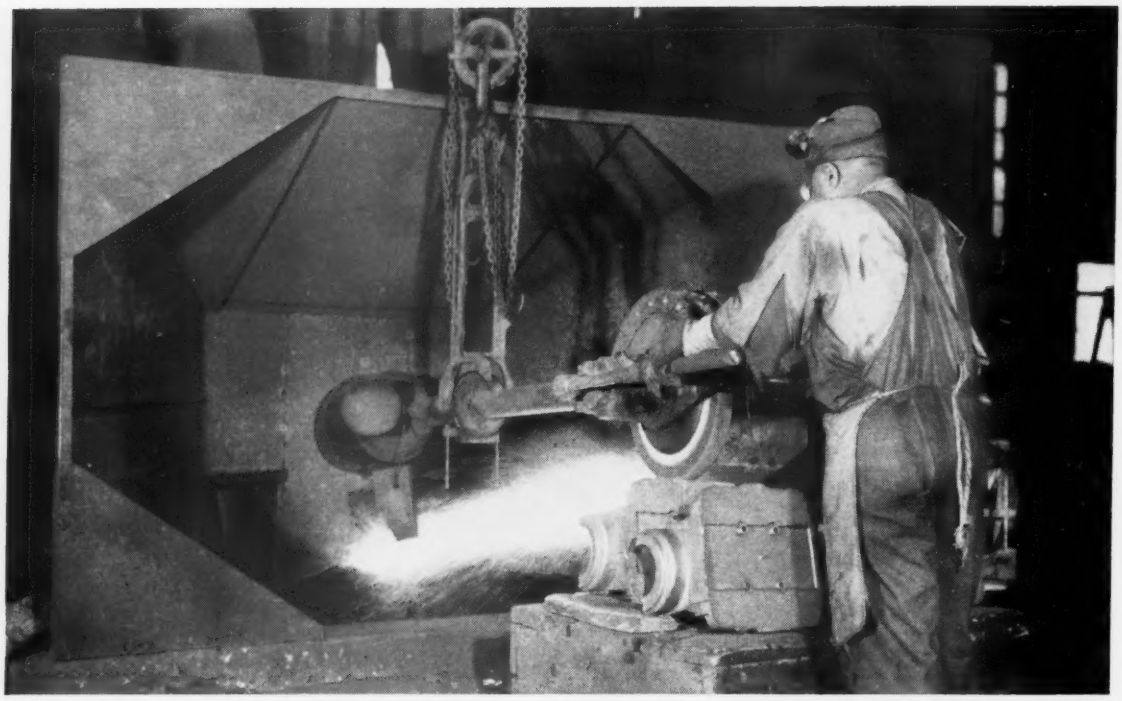
GENERAL ELECTRIC

WRITE NOW FOR THESE MODERN METAL PROCESSING BULLETINS

Annealing Malleable Iron, GEA-5797 **Furnace and Induction Brazing, GEA-5889** **Heat Treating of Aluminum, GEA-5912**

Address: General Electric Co., Sect. 720-120, Schenectady 5, N. Y.

today's best buy is better air!



ROTO-CLONE makes a dust storm disappear for keeps

Swing frame grinder dust can now be controlled effectively—economically

THIS close-up photo of a swing frame grinder in operation tells the story of ROTO-CLONE* dust control better than words. Here's one of the worst offenders when it comes to producing dust, yet the surrounding atmosphere is clear and clean. It's the Type D ROTO-CLONE that does this job so effectively—and its advantages are many:

1. Constant Efficiency in dust separation under all operating conditions.

2. Uniform Air Volume, assuring proper suction at hoods and unvarying air velocities in pipe lines.

3. Small Space Requirement—functions of exhauster and separator combined in compact, self-contained unit.

4. Low Cost of System—ROTO-CLONE may be located at or near dust source, eliminating long pipes and the expense of outdoor installations.

5. Ease of Installation—requires only electrical and piping connections—no complicated parts assembly. May be readily moved to new location if desired.

That's why more grinders are exhausted by Type D ROTO-CLONE than any other type dust collector. And you have the choice of installing this system as a central type with main duct and branch connections or as an individual unit serving a single dust-producing operation. For complete information, call your local AAF representative or write direct to address below.

Find Out How It Works To Save You Money!

Write for Bulletin No. 272A describing the Type D ROTO-CLONE and its wide variety of applications.

**ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

AAF

American Air Filter

COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky • American Air Filter of Canada, Ltd., Montreal, P. Q.

28,800 CONTINUOUS CYCLES*

Amazing non-stop record proves top operating efficiency of 1954 model Shell Molding Machine

"Here are a few of the many outstanding improvements that made this amazing non-stop record possible."

Earl W. Jahn, *President*
Shell Process, Inc.

1. Moving parts subject to wear removed from contact with oven heat.
2. New oven door and operating mechanism is faster, more positive and shock free.
3. Oven heat control — two stage automatic with visible temperature indicator.
4. Readily interchangeable shoes hold pattern carriage accuracy.
5. Larger ejection platen permits placement of ejector pins around extreme perimeter of shell.

**Number of continuous cycles completed prior to publication closing date.*

See this Amazing Shell Molding Machine in Operation

AT THE FOUNDRY SHOW

MAY 8th to 15th, 1954

CLEVELAND, OHIO

SHELL PROCESS, INC.

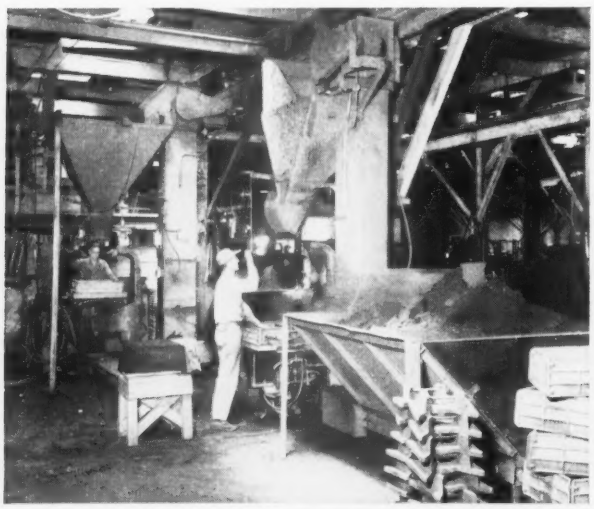
343 McKinstry Avenue, Chicopee, Mass.

Manufacturers of Shell Molding Machines and Allied Equipment

NEWAYGO sand handling eq

Fast growing West Coast foundry ndu uses Newaygo sand handling equipment to increas roc and produce better casting . .

Four HANDY SANDY Units at the H. C. Macaulay Foundry Company have increased casting production more than 25%



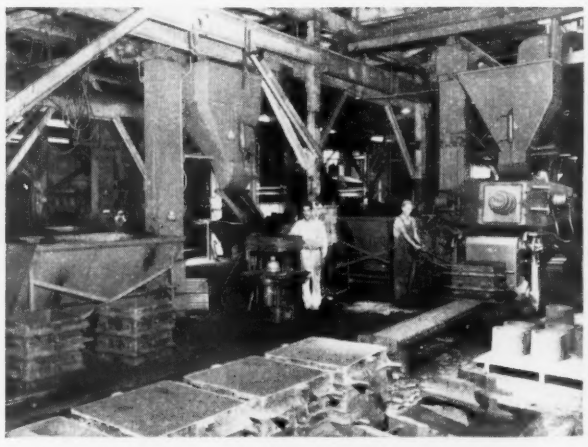
These are the original HANDY SANDYS installed in the Macaulay Foundry almost three years. "Our experience with this unit and the new unit—four machines in all—has been very gratifying. We do not hesitate in commending their performance."

Mr. Earl Paltenghi, Vice-President and General Manager of this pioneer West Coast foundry says, "As a gray iron jobbing shop, now in our 58th year, we have been operating until quite recently with a minimum of sand handling and conditioning machinery.

"However, our first two HANDY SANDY units were installed in July, 1950, and since then the daily production of both automotive and other type castings have improved considerably — and with a better casting appearance than previous methods gave us.

"We attribute the very satisfactory production increase to the fact that our molders no longer exhaust their energy shoveling sand — and also to the simplicity of movements now possible in preparing the molds.

"Improved casting appearance is unquestionably due to effectiveness of the Newaygo Aeration Unit built into each HANDY SANDY at the top of the sand elevator."

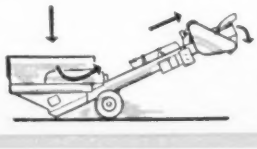


Mr. Leroy Kalin, Superintendent of the H. C. Macaulay Foundry Company states, "We recently installed these two additional HANDY SANDYS and are likewise pleased with their versatile performance. On this set-up solid steel flasks are used, mostly 30" x 30" with 8" drags and 10" copes. A wide variety of work is done on this set-up. . ."We can frankly say that our casting production with these units has increased better than 25%."

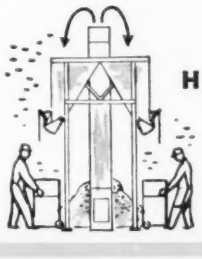
HANDY SANDY

puts sand overhead, eliminating shoveling for the molder.

REDDY SANDY



takes the hard work out of shakeout and sand preparation.

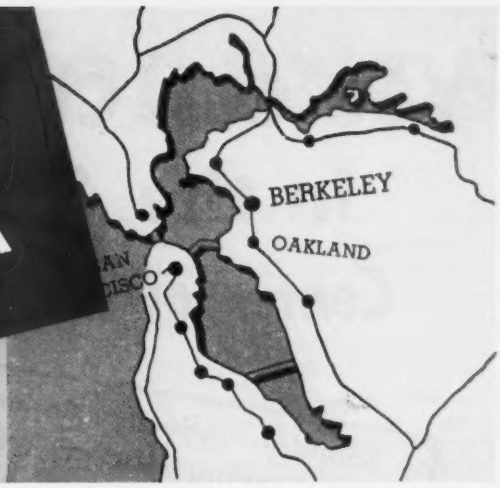


SUPER HANDY SAN

a high capacity i dividual-floor sa handling unit.

at work in

BERKELEY CALIFORNIA



the Berkeley Brass Foundry Co. andy Sandys work over two ears of continuous operation ithout shutdown for repairs

. Bill Burt, Foundry Superintendent at Berkeley ass tells us, "Immediately after installing ewaygo HANDY SANDYS our foundry showed increase of over 30% in casting production. e are making larger than average molds and d that HANDY SANDYS give us substantial vings in shoveling time alone. Molds are 24" x " with 8" copes and 8" drags.

"Needless to say we are also very pleased with e performance of our HANDY SANDYS due to e fact that in two years of continuous operation ey have not had a breakdown of any sort or ve any parts been replaced. This helps make r foundry a dependable source of uninterrupted oduction.

"At present we are planning on the addition of other Newaygo HANDY SANDY unit."

Showing the neat, compact molding set-up afforded by the efficient twin hopper HANDY SANDY unit. Sand is fed overhead to each station from a central hopper. Additional aeration is given to sand at the top of the unit. Mr. Burt credits this extra aeration for better casting appearance.

RUSSO FOUNDRY EQUIPMENT CO.
3882 Fairway Ave., Oakland 5, Calif.
Lockhaven 8-1303 or 8-1361

Exclusive West Coast Sales and Service Engineers covering the entire states of Arizona — California — Idaho — Montana — Nevada — Oregon — Washington and Utah. Also Alberta — British Columbia and Saskatchewan in Canada.

A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone today.

NEWAYGO | **engineering company**
NEWAYGO, MICHIGAN

Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

You Can Cut Your Foundry Costs in the *Birmingham* District

Center of the Growing Southern Market

Foundry Productive Capacity
10 Leading Market Areas

Principal City	Annual Capacity Net Tons
Detroit	2,419,332
Chicago	2,094,648
BIRMINGHAM	1,935,336
Pittsburgh	1,899,804
Cleveland	1,670,196
Indianapolis	1,173,360
Milwaukee	1,067,820
Los Angeles	870,588
South Bend	541,440
Buffalo	498,084

Source: FOUNDRY — August, 1953

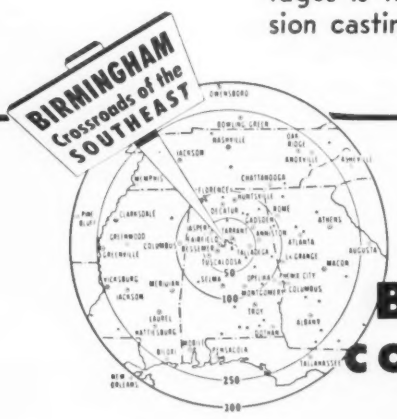
Increasing competition in practically every field is necessitating re-examination of production costs.

In the central Birmingham district—America's Number 3 market area in foundry capacity—there is an outstanding present opportunity for large and small foundries making all kinds of castings to cut costs and build sales volume.

HERE FOUNDRIES WILL FIND:

- ✓ **High and low phosphorus pig iron.**
- ✓ **Abundant supply of world's finest foundry coke.**
- ✓ **Natural and by-product gas and cheap electricity.**
- ✓ **Good moulding sand.**
- ✓ **Skilled, co-operative, native-born workers — many from families who have worked in foundries for two or even three generations.**
- ✓ **Fast growing Southern markets, where many millions are being invested in new plants.**
- ✓ **Superior transportation facilities — rail, truck and water — and favorable freight rates.**

This unusual combination of manufacturing and distributing advantages is the major reason why foundries making rough and precision castings are prospering in Birmingham.



Write this Committee or any of its undersigned members for detailed data on how to cut your foundry costs in this central district of the South.

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1914 Sixth Ave., N., Birmingham, Ala.

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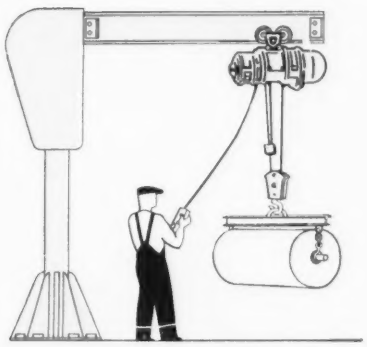
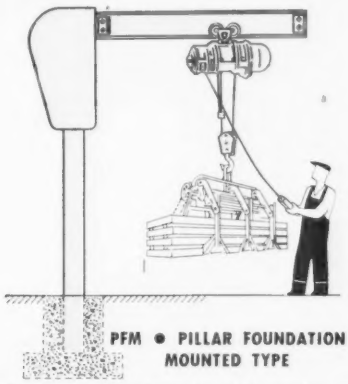
Industrial JIB CRANES

Industrial Jib Cranes are designed and built to the same high standard set for Industrial Overhead Traveling Cranes. The smooth performance and unfailing service of these quality Jib Cranes has made them favorites throughout industry. Consult Industrial Crane & Hoist Corporation for better equipment to solve your materials handling problems.



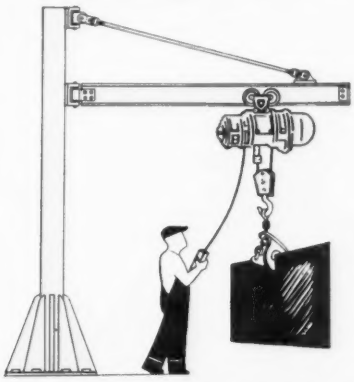
PBM • PILLAR BASE MOUNTED TYPE

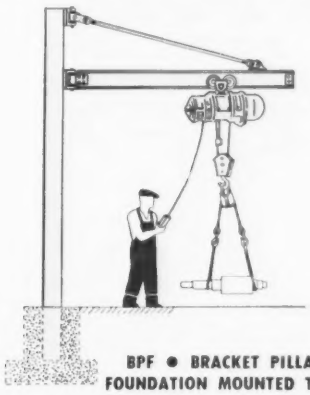


PFM • PILLAR FOUNDATION MOUNTED TYPE

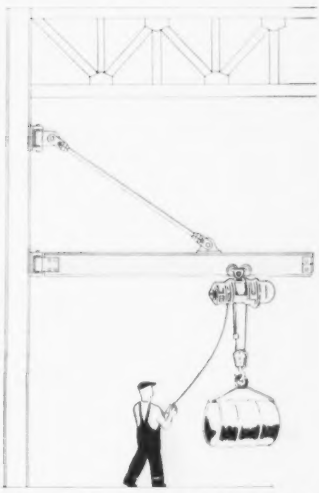
The Industrial PBM and the PFM Heavy Duty Jib Cranes are the same except for the construction of the base. Self-supporting and designed to revolve in a complete circle these Jibs can be economically used in a myriad of applications. The 4 roller, 9 bearing head is designed for heavy duty applications and both models are available in capacities up to 12,000#.

The Industrial PBM and the PFM heavy duty, self-supporting Jib Cranes are designed for 360° rotation, are of welded steel construction, and equipped with ball and roller bearings. Capacities up to 12,000 #.





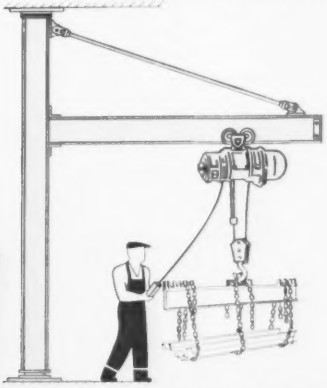
BPF • BRACKET PILLAR FOUNDATION MOUNTED TYPE



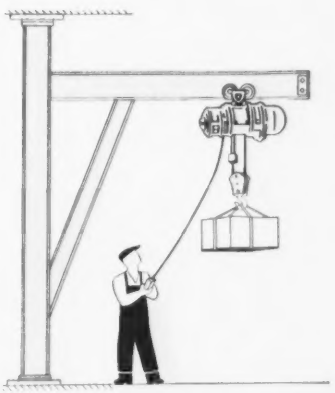
WBT • Industrial Wall Bracket Type Jib Crane for mounting on a steel column or factory wall. Available in capacities up to 6000#.

BPB • BRACKET PILLAR BASE MOUNTED TYPE

The Industrial BPB and the BPF self-supporting Jib Cranes are designed for 180° rotation. Equipped with annealed cast steel hinge fittings, heavy duty bronze bearings and double tie rods. Capacity up to 6000#.



MTD • Industrial Mast Type Jib Cranes designed to rotate 360°. Equipped with heavy duty top and bottom bearings. Capacities up to 12,000#.



MTC • Industrial Mast Type Compression Brace Jib Crane, designed to rotate 360°, equipped with heavy duty top and bottom bearings. This Jib is designed for high lift in capacities up to 12,000#.

WRITE FOR CATALOGS

Industrial CRANES

INDUSTRIAL CRANE & HOIST CORPORATION

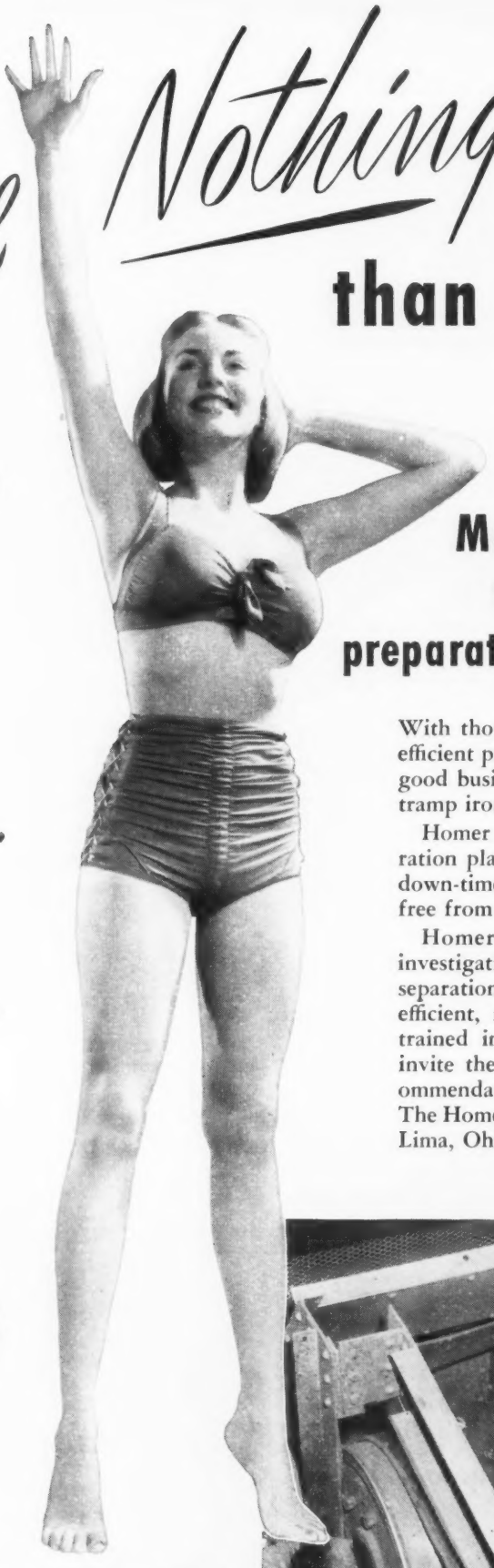
(formerly Industrial Equipment Co.)

341 NORTH ADA STREET — CHICAGO 7, ILLINOIS

Overhead Cranes • Jib Cranes • Monorail Systems • Crane Runways

Representatives in Principal Cities

Choose Nothing Less than the BEST!!!



Depend on Homer Magnetic Separators to protect costly preparation plant equipment

With thousands of dollars invested in modern, efficient preparation plant equipment, it is simply good business to protect it from the ravages of tramp iron.

Homer is interested in protecting your preparation plant equipment . . . in eliminating costly down-time and in giving you a clean product—free from Tramp Iron.

Homer maintains complete facilities for investigation and research of your magnetic separation problems. Homer also maintains an efficient, nation-wide staff of sales engineers, trained in magnetic protection procedure. We invite the use of our services. Competent recommendations made without obligation to you. The Homer Manufacturing Co., Inc., Dept. 156 , Lima, Ohio.

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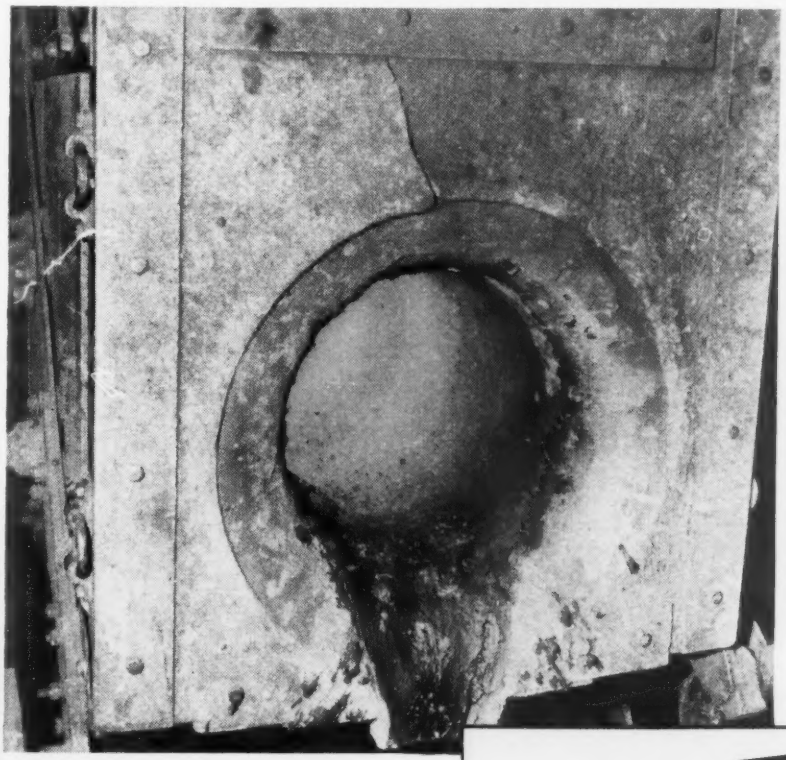
Certain!

HOMER

Photo at right shows a 30" x 42" Homer Magnetic Pulley cobbing a mixture of iron ore and rock. This Homer unit is handling 110 net tons/hr., at a belt speed of 300 ft./min. Iron ore content is approximately 40%, with rock sizes from 3" x 6" down to fines.

HIGH ALLOY STEEL is being poured here from a 1000-lb. high-frequency induction furnace. It is lined with a Norton MAGNORITE* refractory cement which lasts 16% longer than the cement previously used.



CLOSE-UP OF THE SAME FURNACE, taken immediately after metal has been poured, shows how effectively this engineered-to-the-job Norton MAGNORITE cement resists mechanical and chemical attack.

How much more steel will you melt per lining *with Norton* ENGINEERED Rx PRESCRIBED *MAGNORITE cements?*

It's easy to find out how much longer Norton MAGNORITE refractory cement will last in your high-frequency furnaces than your present linings. Just call on the 40-year problem-solving experience of Norton Refractory Research which gave this satisfied customer (name on request) 16% longer lasting lining.

Whether you melt straight steel or heat-resistant compositions, you'll get a Norton MAGNORITE cement that's Engineered Rx Prescribed to fit your exact requirements. It will withstand temperatures up to 3250 F. if need be. It will have a high-rammed density that offers great resistance to metal penetration, erosion and chemical attack . . . and freedom from shrinkage cracks that often lead to furnace failure. Why not run a test on one of your furnaces soon?

Whatever your metal-melting problem, you can depend on Norton Research to help you. Working with MAGNORITE*, ALUNDUM*, CRYSTOLON* and FUSED STABILIZED ZIRCONIA cements and special shapes, Norton engineers are sure to come up with the right answer for you.

For full details about Norton Rx Refractories, contact your nearby NORTON refractories engineer, or write to NORTON COMPANY, 302 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

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REFRACTORIES
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Making better products... to make other products better
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"These blowers have e
we thought re

HILLS-McCANNA COMPANY MANUFACTURERS & FOUND

TELEPHONE GRaceland 2-1150 • 3025 NORTH WESTERN A
CHICAGO 18, I

January 19, 1954

Federal Foundry Supply Co.
4600 East 71st Street
Cleveland 5, Ohio

Gentlemen:

Enclosed are some pictures of our SAN-BLO set-up, showing our new PULSATOR with LOW PRESSURE PRE-FILL, which we are very much pleased with.

The other machine in the pictures is our original SAN-BLO which we bought in Octo-ber, 1951, and are also very well pleased with.

These blowers have enabled us to blow co that heretofore we thought were impossib to run on a core blower.

I feel that, between your SAN-BLO machi and our core-room superintendent, Char Young, we have done a very fine job he

Yours very truly,

HILLS-McCANNA COM

M. D. King
Foundry Superi

MDK/js

CHEMICAL PROPORTIONING PUMPS • DIAPHRAGM VALVES—SAUNDERS PATENT • MAGNESI

Hills-McCanna's PULSATOR model SAN-BLO with "LPP" (low-pressure pre-fill). "Pulsating action" permits blowing wooden core boxes as safely as metal. "LPP" pre-fills boxes using low air pressure, then packs the sand with line pressure—holding core box wear and maintenance to a minimum.

FEDERAL

MEMBER FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. FEMA

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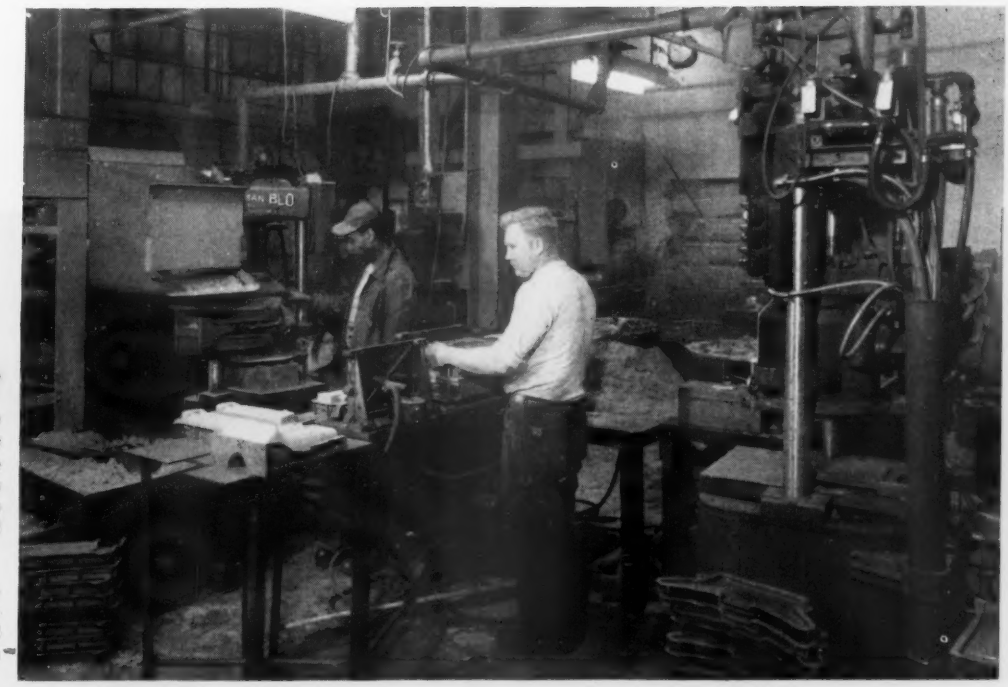
CHAT

e led us to blow cores that heretofore ghtre impossible to run on a core blower"



Hills-McCanna's "SAN-BLO department". Their first SAN-BLO is at the left, the PULSATOR model at the right. VIBRADRAW core drawing machines are used for drawing cores.

Over-all view of the Hills-McCanna core room. SAN-BLO machines are located just to the left of the core baking oven.

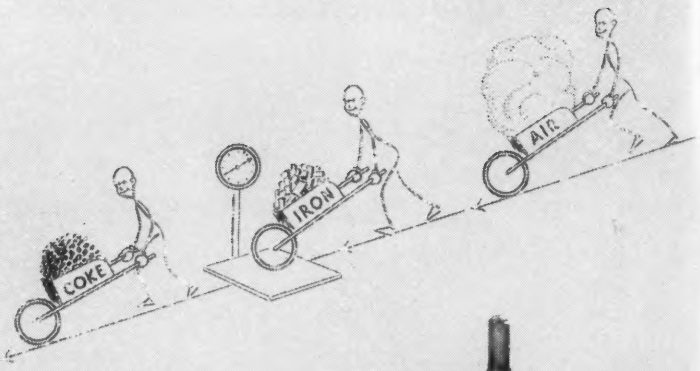
THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CHATTANOOGA CHICAGO DETROIT LOS ANGELES MILWAUKEE NEW YORK

EUROPEAN REPRESENTATIVE: SA. PH. BONVILLAIN & E. RONCERAY Rue Paul-Carle a Choisy-Le-Roi, Seine, France

Foundry costs come down

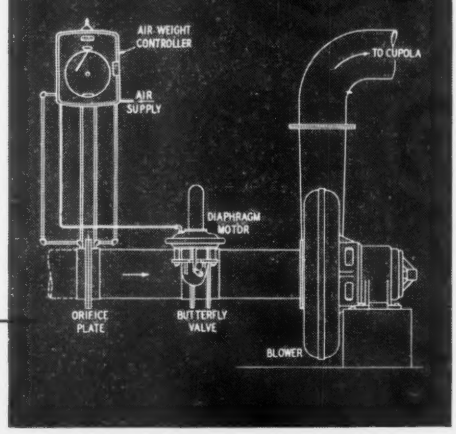


. . . when you weigh air too

Leading foundries report lower fuel costs, fewer rejects, and less pigging after installing Foxboro Air Weight Control. That's because the cupola blast is fully compensated for every change in atmospheric pressure and temperature. *The right amount of oxygen for the quantity of coke charge* insures better combustion, more uniform heats and better quality castings.

Foxboro Air-Weight Controllers automatically control cupola blast by *weight of air* instead of volume. They are one of Foxboro's many original developments in instrumentation to cut industrial costs. Representative installations will be found throughout the foundry industry. The names of those located nearest you will be gladly sent on request.

Now, . . . you can make the most of modern foundry practice by installing the advanced-design Model 40 Air-Weight Controller by Foxboro. Installation is easy and fast. Results will far outweigh the investment. Write for complete details. **The Foxboro Company, 323 Neponset Avenue, Foxboro, Mass., U. S. A.** Branches in principal cities.

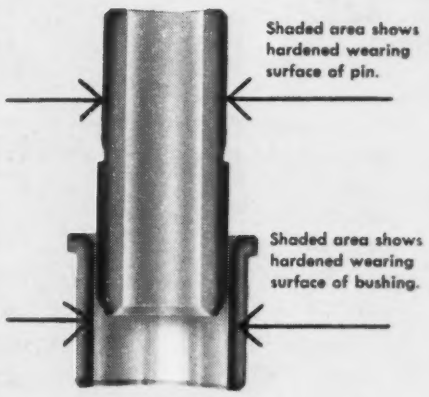


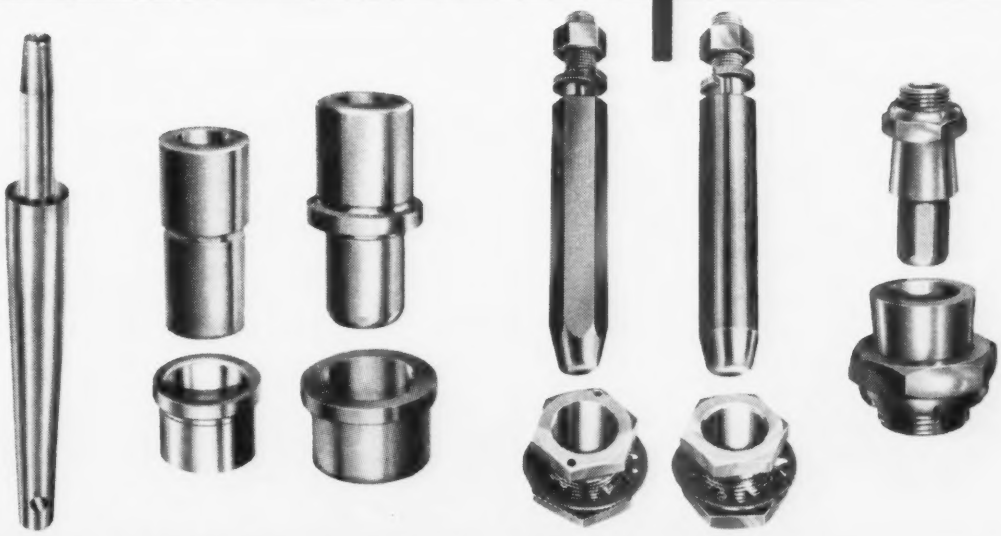
Typical installation set-up of Foxboro Air-Weight Control . . . readily adaptable to either a centrifugal blower (shown in diagram) or a positive displacement blower.

FOXBORO REG. U. S. PAT. OFF. **AIR-WEIGHT CONTROLLERS**

carburized and hardened wearing surfaces increase life of UNIVERSAL flask pins and bushings

The wearing surfaces of Universal flask pins and bushings are carburized and hardened so they can take long, rigorous wear and rough treatment in the foundry. Both pins and bushings are double quenched and double drawn to produce strong ductile cores with a fine grain structure that will withstand considerable stress and strain without breaking. Universal flask pins and bushings are precision ground to extremely close tolerances to insure instant, accurate alignment of cope and drag. Plain, taper, round, hexagonal and threaded series pins and bushings are available in a complete range of sizes as regular stock items. For complete information, write to the office nearest you — Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wisc., or the home office.





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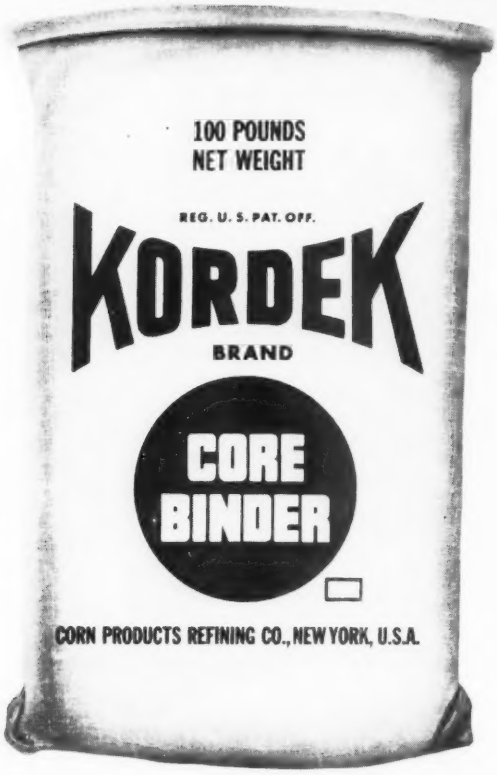
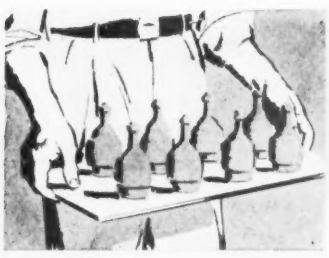
UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN



why KORDEK® is the preferred dry bond for cores

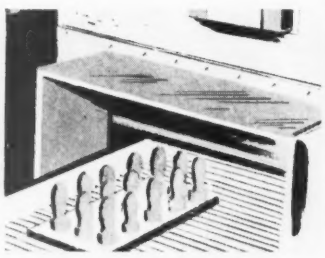
Kordek Core Binder renders complete binder coverage for foundry purposes. Kordek Core Binder develops a superior dry bond. Kordek is highly soluble, does not absorb core oil, and burns out completely, delivering smooth draws. Quick deliveries of Kordek can be made to any plant location.

Special technical consultation is yours without cost or obligation.



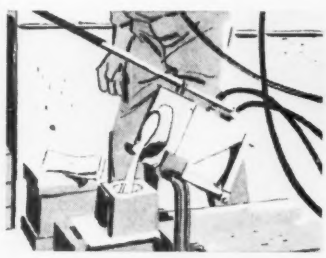
Superior Bake Strength

Kordek-bonded cores maintain shape and dimension throughout handling and storage.



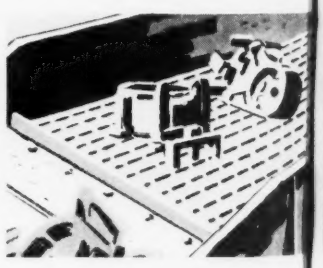
Quick Drying

This property cuts down oven time, thus increasing oven capacity.



Excellent Permeability

You reduce costly "blows" and casting losses due to inadequate venting.



Adequate Collapsibility

Kordek burns out at just the proper instant, eliminating strains and hot-tears.

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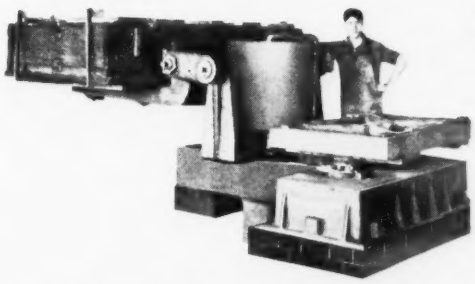
What 50 Years

MEANS TO YOU



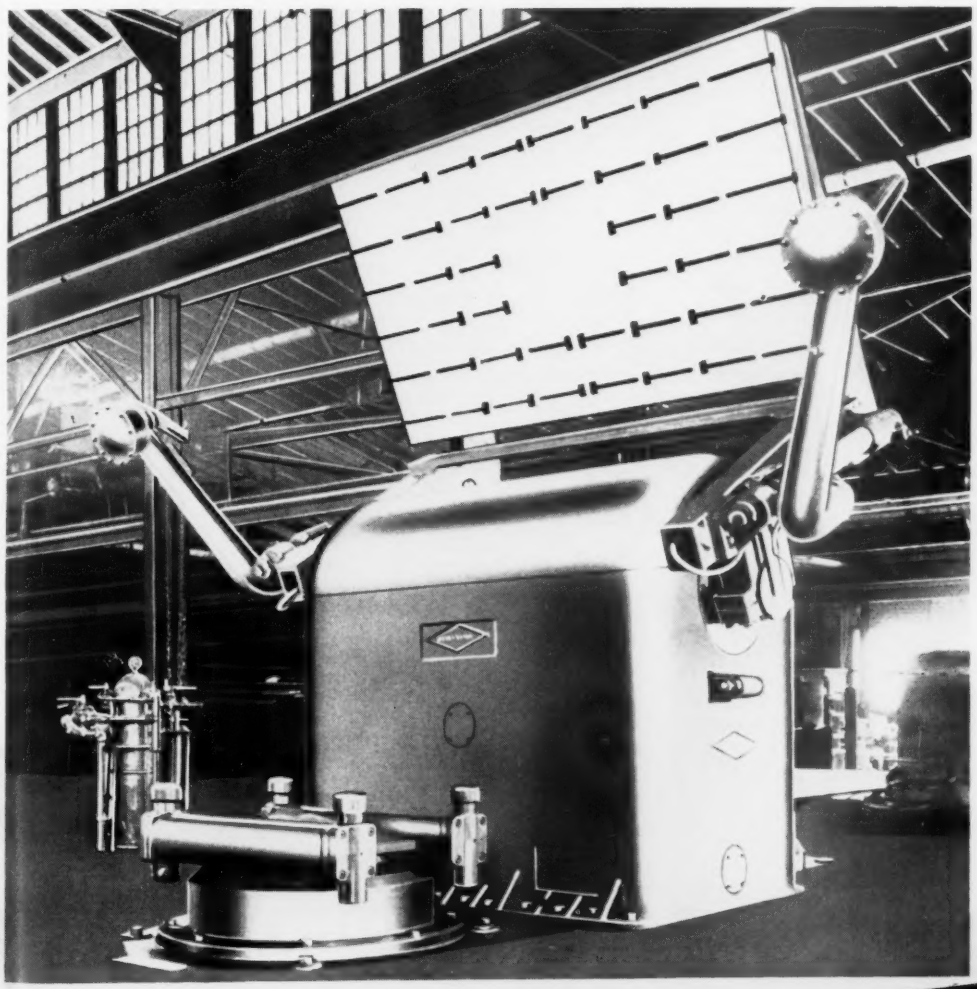
An early model Davenport Roll-over.

More than 50 years ago the Davenport Machine and Foundry Co. sold their first roll-over foundry molding machine.

These many years have given Davenport engineers an opportunity to develop—through experience—today's outstanding line of Davenport foundry molding machine equipment.

Davenport machines are in daily use in many of the larger production, as well as the smaller jobbing foundries throughout America.

Davenport Molding Machines are available in 66 sizes and models to meet the individual requirements of your foundry.



Modern 12,000 pound Davenport Jolt Roll-over Pattern Draw Machine.

Let us send you our catalog or have one of our sales engineers come to your plant and discuss with you the possibility of lowering your present molding costs.

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SAVE MONEY

RIGHT DOWN THE LINE

ELIMINATE BREAKAGE IN STORING AND HANDLING

AlSiMag Strainer Cores are hard, strong, will stand the roughest handling. They are not affected by moisture, are flat and uniform for fast, easy use. Packed in easy-to-handle cartons for the moulder's convenience.

RESIST POURING SHOCK

AlSiMag Strainer Cores will not erode or fracture under the heat and force of pouring. They are gas-free, not affected by moisture, won't freeze-off the metal. You can depend on AlSiMag Strainer Cores for clean, slag-free castings.

CUT REJECTS AND MACHINING COSTS

Foundries using AlSiMag Strainer Cores have completely eliminated rejects due to core failure. Inclusions, dirty metal, shrink holes and other defects are reduced to minimum. AlSiMag cores always result in more good castings per moulder per hour.

TEST THEM IN YOUR OWN FOUNDRY

Samples of standard sizes free on request. Samples made to your specifications at reasonable cost.

- **14 STANDARD SIZES**
- **2 SPECIAL COMPOSITIONS**

WRITE FOR BULLETIN 532, **giving details on AlSiMag Strainer Cores — standard sizes and custom designs — and AlSiMag Cut-off Cores, Troughs, and Gate Tubes.**

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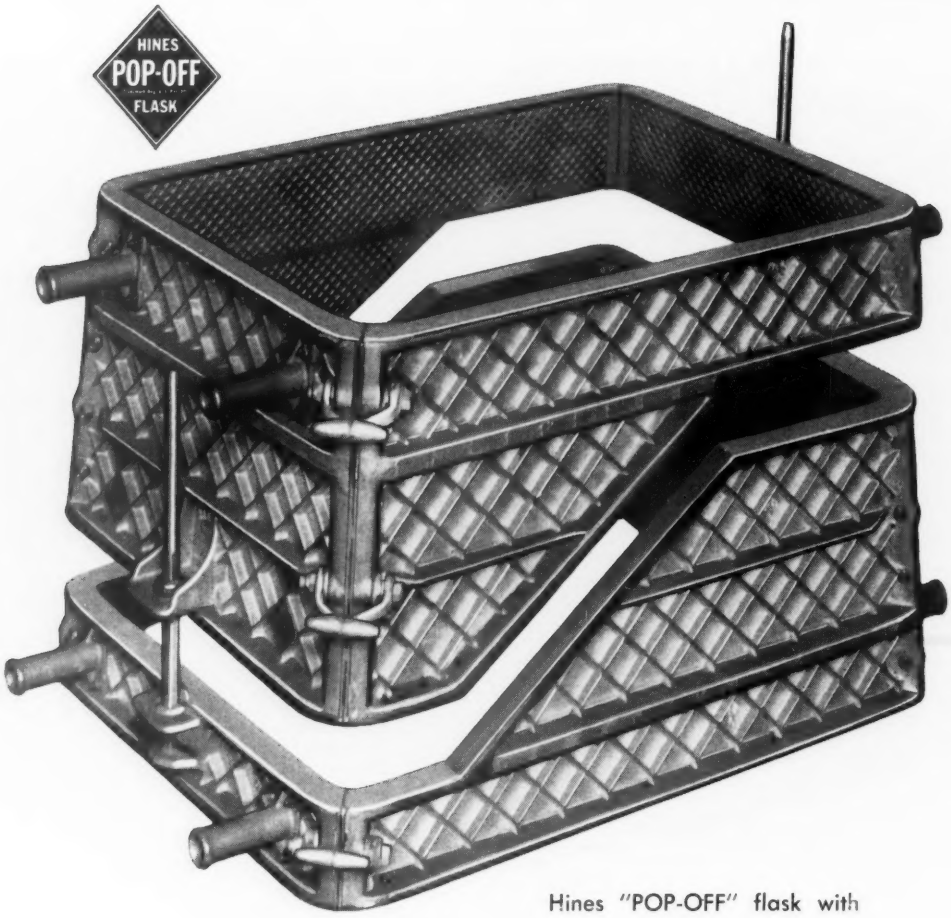
52nd YEAR OF CERAMIC LEADERSHIP



Hines "POP-OFF" flask with special cut-parting for better, faster molding conditions. 18" wide, 28" long, 22" high.

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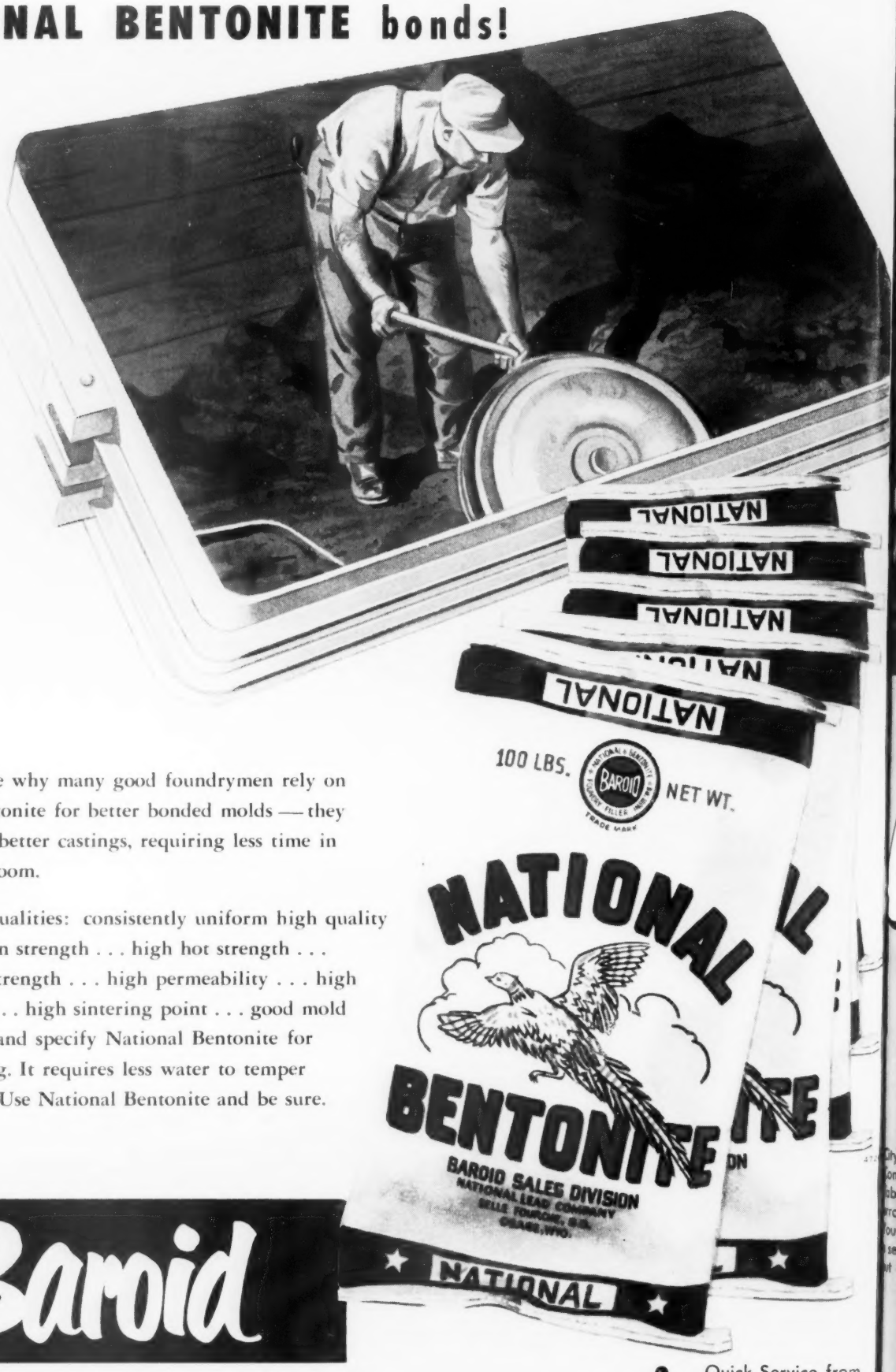
. . . Finer finished castings with NATIONAL BENTONITE bonds!



It's easy to see why many good foundrymen rely on National Bentonite for better bonded molds — they can count on better castings, requiring less time in the cleaning room.

Check these qualities: consistently uniform high quality . . . good green strength . . . high hot strength . . . high tensile strength . . . high permeability . . . high deformation . . . high sintering point . . . good mold durability — and specify National Bentonite for better bonding. It requires less water to temper correctly, too. Use National Bentonite and be sure.

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Translating precision from your blueprints into patterns is the function of our layout and inspection department. Here skilled hands carefully pilot your patterns through every operation performed on them. The latest methods and the finest equipment are used in this important work. Only through such painstaking layout and inspection can unvarying high quality be maintained . . . and it is on such quality that City Pattern Foundry & Machine Company has built its reputation.

"Piloted precision" is another reason why leading manufacturers rely on City Pattern Foundry & Machine Company for the utmost in accuracy, economy and production utility in wood and metal patterns.

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Setting the Pattern in Patterns

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

Deoxidation Studies Show Advantages of Silicomanganese

Silicomanganese has proved to be highly efficient and economical as a furnace block and deoxidizer, as well as an alloy addition. Steel producers have found that it saves furnace time, produces cleaner steel, and increases the yield of rolled products.

Excellent Blocking Addition

When used as a blocking addition, silicomanganese stops the carbon-oxygen reaction in the open-hearth bath and permits close control of analysis. The alloy has a ratio of approximately 3.5 manganese to 1 silicon. This proportion will produce a high degree of deoxidation in the bath.

Why Silicomanganese Is Effective

The carbon boil is arrested more positively by this combination alloy, containing both silicon and manganese, than it is by larger amounts of silicon alone. As a result, close control of the carbon level can be maintained. Also, because of the low carbon content of silicomanganese, the heat may be blocked at a comparatively high carbon level. This saves furnace time, which is critical in reducing costs. Since silicomanganese gets more oxygen out of the bath than silicon alone, the steel is cleaner and has improved surface quality.

Metallurgical Studies Made

Work done by Herty and his associates (1,2) showed that manganese tends to flux silica inclusions resulting from deoxidation, and permits them to grow in size so that they float out of the bath more rapidly.

More recently, it was found by Hilty and Crafts (3) that manganese and silicon in combination lower the oxygen content much more than silicon alone (see Fig. 1). They also determined that, although manganese by itself is not a strong deoxidizer, it substantially intensifies the deoxidizing power of silicon.

It was shown that in steels with lower silicon contents (below 0.05 per cent), manganese in the amounts usually present as a residual has a strong influence. However, in the silicon range normally used for deoxidation (0.05 to 0.25 per cent), more manganese is required to obtain the full benefit of the combined deoxidizers. For example, at 1600 deg. C, iron with 0.10 per cent silicon and 0.10 per cent or less manganese contains about 0.017 per cent oxygen. With 0.50 per cent manganese, it contains only 0.009 per cent oxygen (see Fig. 1).

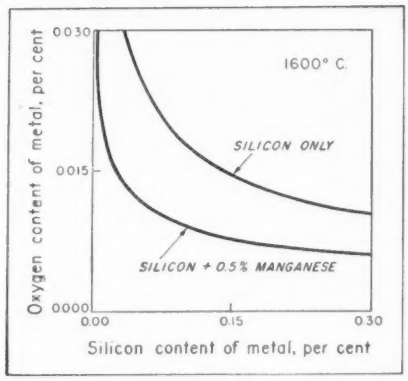

Fig. 1. Limit of solubility of oxygen in iron-silicon alloys, plain and with 0.50 per cent manganese at 1600 deg. Centigrade.

These data thus confirm an observation made by Tenenbaum and Brown (4) that steel as tapped from the furnace is materially lower in oxygen after blocking with silicomanganese.

In another study, made by Silliman and Forsyth (5) it was demonstrated that heavier than usual additions of silicomanganese result in a marked improvement in surface quality. About twice the usual addition of silicomanganese gave a substantial increase in the yield of finished product.

Silicomanganese Produces Cleaner Steel

Initial deoxidation in the furnace with silicomanganese produces very clean steel, particularly in grades below 0.25 per cent carbon. Several factors contribute to the cleansing action of silicomanganese. The amount of dirt in steel seems to be proportional to the maximum oxygen content prior to final deoxidation. Heats that are oxidized to a low carbon and recarburized, as were early rail and forging steels, are dirtier than those in which the carbon is "caught on the way down."

It is also well recognized that medium-manganese and low-carbon steels that are blocked at higher carbon (lower oxygen) contents, with low-carbon ferro-alloys, are cleaner than those taken to a lower carbon level and recarburized with high-carbon ferro-alloys. Silicomanganese is low enough in carbon to block at higher carbon levels. As pointed out by Tenenbaum (6), there is also a decided economic advantage in not driving to such low carbon contents before blocking.

Suitable For Ladle Additions

In addition to its use as a bath deoxidizer, silicomanganese has proved particularly effective as a ladle addition for the deoxidation of semi-killed steels. The alloy is also used to provide the complete ladle addition of manganese in the manufacture of medium-manganese, acid-steel castings.

Metallurgical Service Available

Our metallurgists will be glad to help you with the use of ELECTROMET silicomanganese. This alloy contains 65 to 68 per cent manganese, and is produced in maximum 1.50, 2.00, and 3.00 per cent carbon grades. All grades are furnished in a lump size of 75 lb. x 2 in. and in a crushed size of 2 in. x down. If you wish further information, please write, wire, or phone the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

References

1. C. H. Herty, Jr. and G. R. Fitterer, "New Manganese-Silicon Alloys for the Deoxidation of Steel." U. S. Bureau of Mines, Report of Investigations #3081, February, 1931.
2. C. H. Herty, Jr., C. F. Christopher, M. W. Lightner, and H. Freeman: "The Physical Chemistry of Steelmaking; Deoxidation of Open-hearth Steel with Manganese-silicon Alloys," U. S. Bur. of Mines, Carnegie Tech and Min. and Met. Advisory Boards, Coop. Bul. 58, 1932.
3. D. C. Hilty and W. Crafts, "The Solubility of Oxygen in Liquid Iron Containing Silicon and Manganese," Trans. AIME, 188, 1950, pp. 425-436.
4. M. Tenenbaum and C. C. Brown, "The Total Oxygen Content of Plain Carbon Open-hearth Steel During Deoxidation and Teeming," AIME 162, 683-703, 1945.
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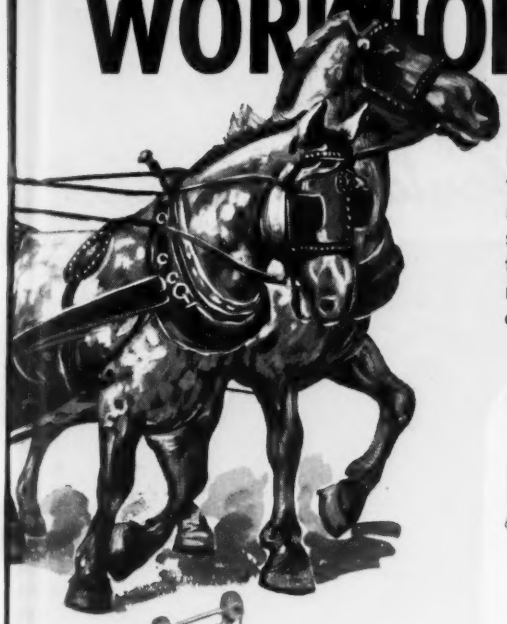
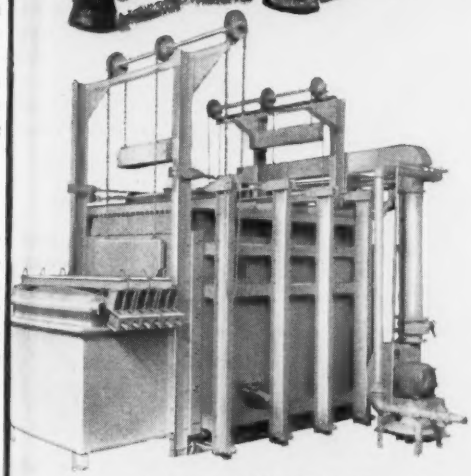
6. M. Tenenbaum, "The Economic Aspects of Deoxidation," Open-hearth Proceedings, 28, 1945, pp. 349-352.

The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.

WORKHORSES for ALUMINUM

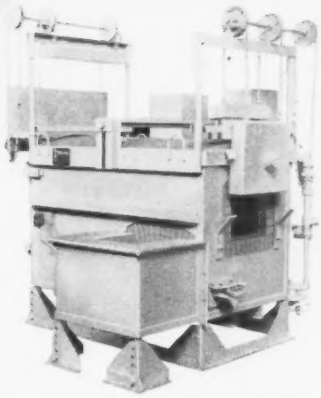


Here are the furnaces that bear the brunt of the burden in the aluminum foundry industry. They are designed for production of unsurpassed quality metal, in the fastest, most efficient and economical manner. Each has its specific purpose and capacity, meeting the exacting demands of sand foundries, die casters, permanent mold plants and smelters. They are recognized as the finest in the industry, reduce costs and make working conditions most agreeable. All furnaces may be fired by either gas or oil.



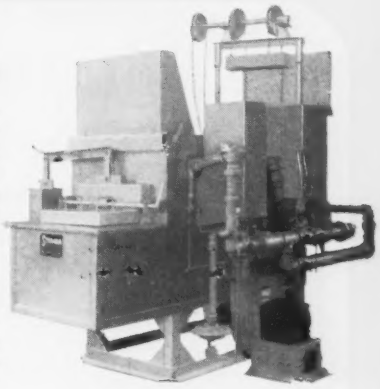
SMELTERS FURNACE

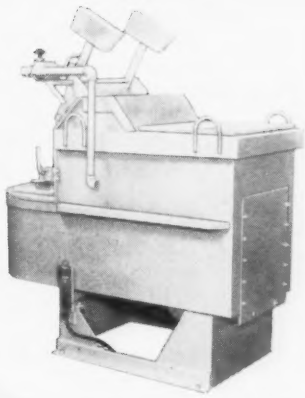
Built especially for smelters and other large melters. Easy charging, drossing, fluxing and alloying. Can be built to your own specifications. Capacities from 3000 lbs. Aluminum up.



MODEL "DC" FURNACE

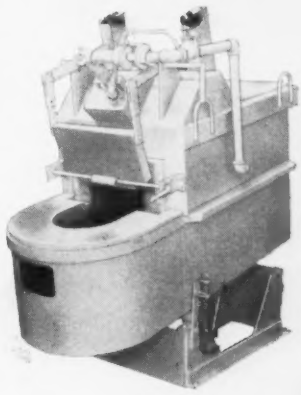
The 2 in 1 furnace. Breakdown and Holding in the same unit. Cold metal never reaches the molten bath. Assures metal of the finest quality on all classes of work. Close temperature control. Can be used as a sweat furnace for reclaiming inserts. Ideal for all types of plants including sand, permanent mold and die casting. Capacities from 350 lbs. Aluminum up.

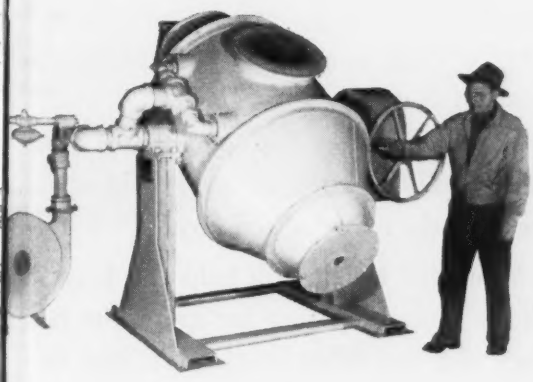




MODEL "DSC" DIE CASTING FURNACE

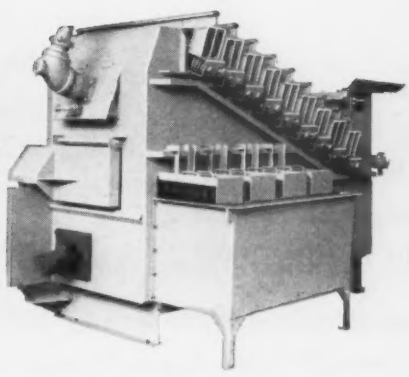
A small reverberatory furnace for melting and holding, or for holding only when hot charged at the die casting machine. Made in various sizes to meet your requirements.





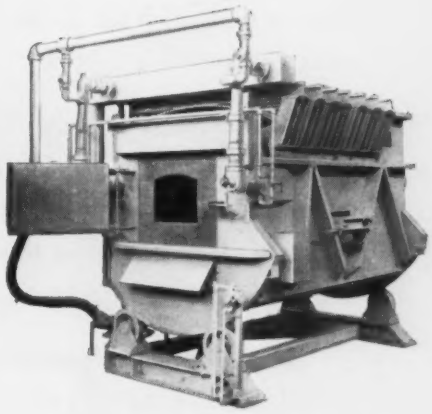
MODEL "BFC"

Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.



MODEL "MC" DIP-OUT TYPE

For melting and holding all in the same furnace. Hot metal always available. No iron pots or crucibles to replace. Capacities from 500 to 5000 pounds of aluminum.



MODEL "SW"—TILTING TYPE

Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.

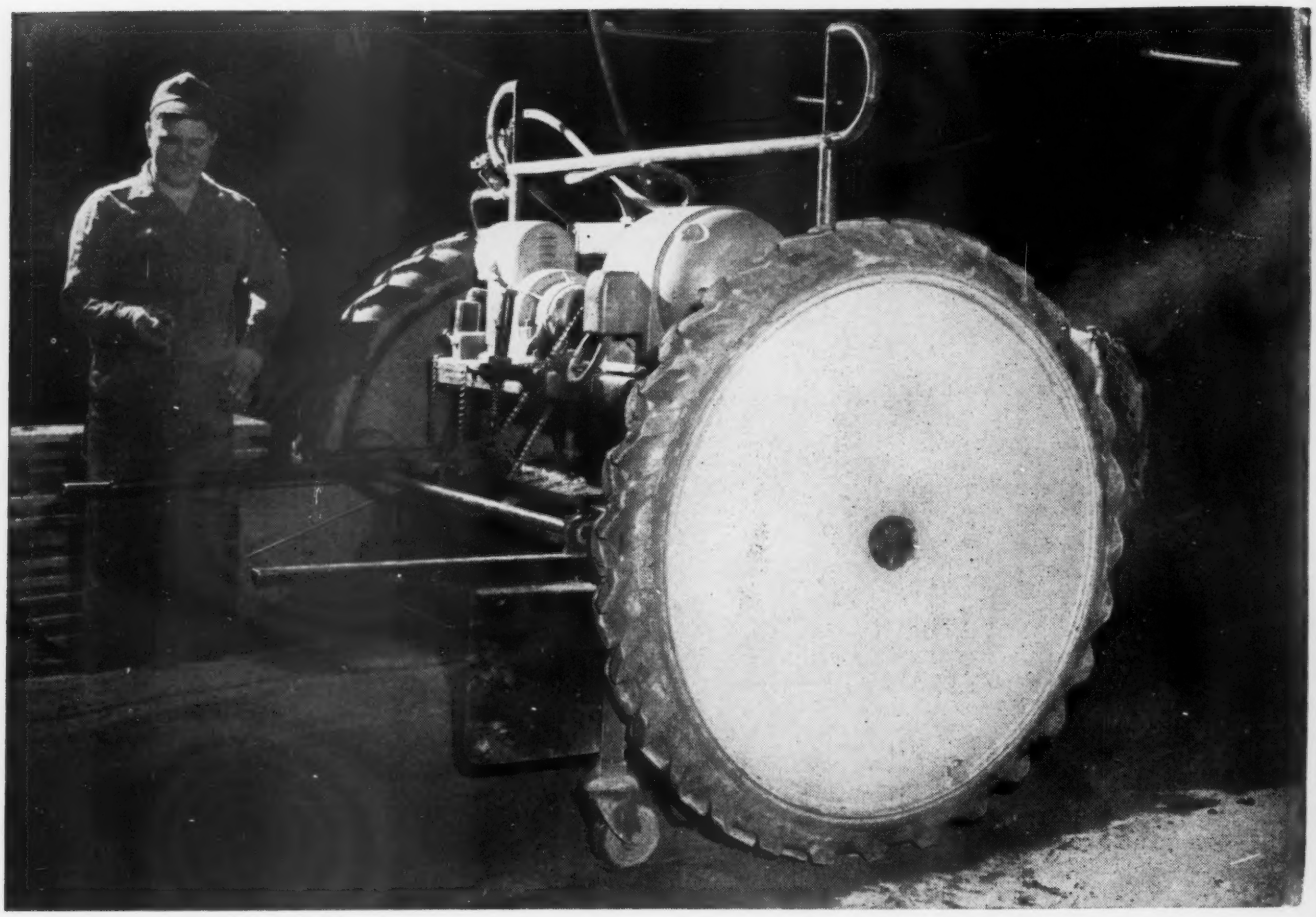
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

IN TUNE WITH THE TIMES

WITH "*The Moulders' Friend*"



Costs rise higher and higher every year. To keep in tune with the times we must find cheaper ways to do the job better.

Foundrymen who use The Moulders' Friend sand conditioner agree that the thousands of flat tempered steel wires in the brush revolving at high speed do the most thorough job of mixing and aerating sand heaps on the foundry floor.

The Moulders' Friend is completely self-propelled. It has a capacity of two tons of thoroughly conditioned sand per minute with travel speeds up to 50 feet per minute. One man does the job.

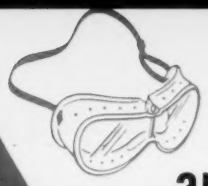
A screen for removing trash and tramp iron and a water dispenser for accurately wetting down the sand as the machine travels over the heap are valuable added features.

The Moulders' Friend fits your foundry. Being carried on two large wheels it turns short and handles well in the crowded foundry.

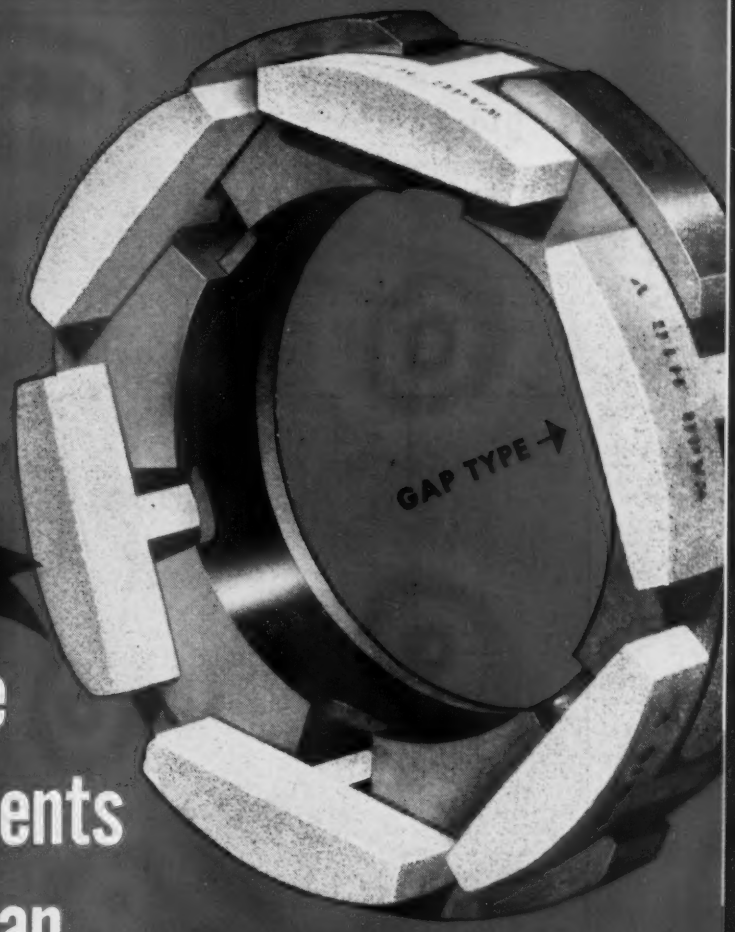
The Moulders' Friend will help you keep in tune with the times by paying for itself with better castings and less labor cost. Investigate this remarkable machine today. See one in operation. Valuable information is yours for the asking. Please write for bulletin F.

THE BRUSH DOES THE JOB

"The Moulders' Friend" ● Dallas City, Illinois

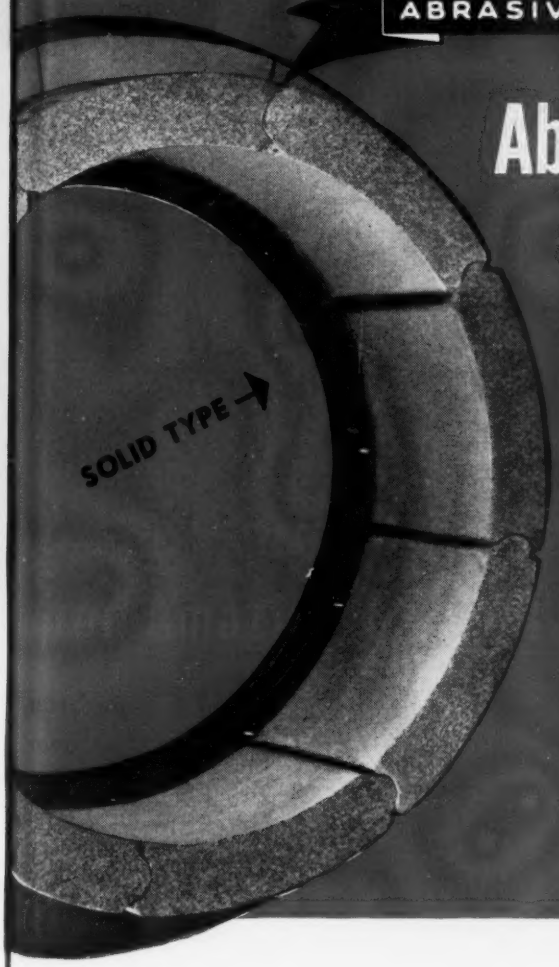


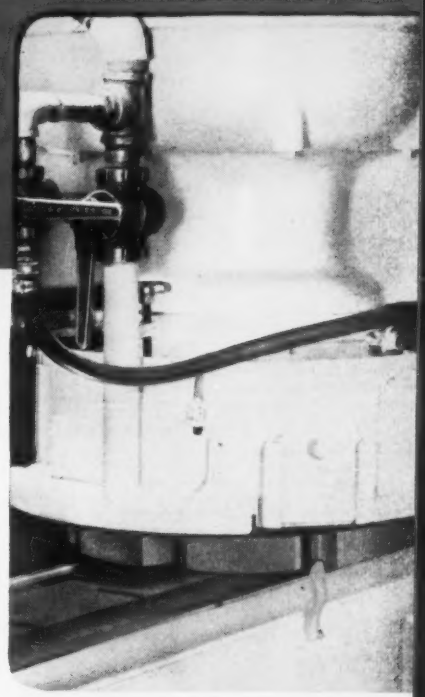
any way you look at it...



SIMONDS ABRASIVE CO.

Abrasive Segments mean surface grinding with savings





Less expensive than cylinder wheels. More uniform in grinding characteristics. Easily handled. Quickly mounted. Fast cutting. Compact for less storage. Fit all types of chucks. Gap type for large flat surfaces—solid type for small pieces grouped or chucked together. Write for bulletin ESA-188.

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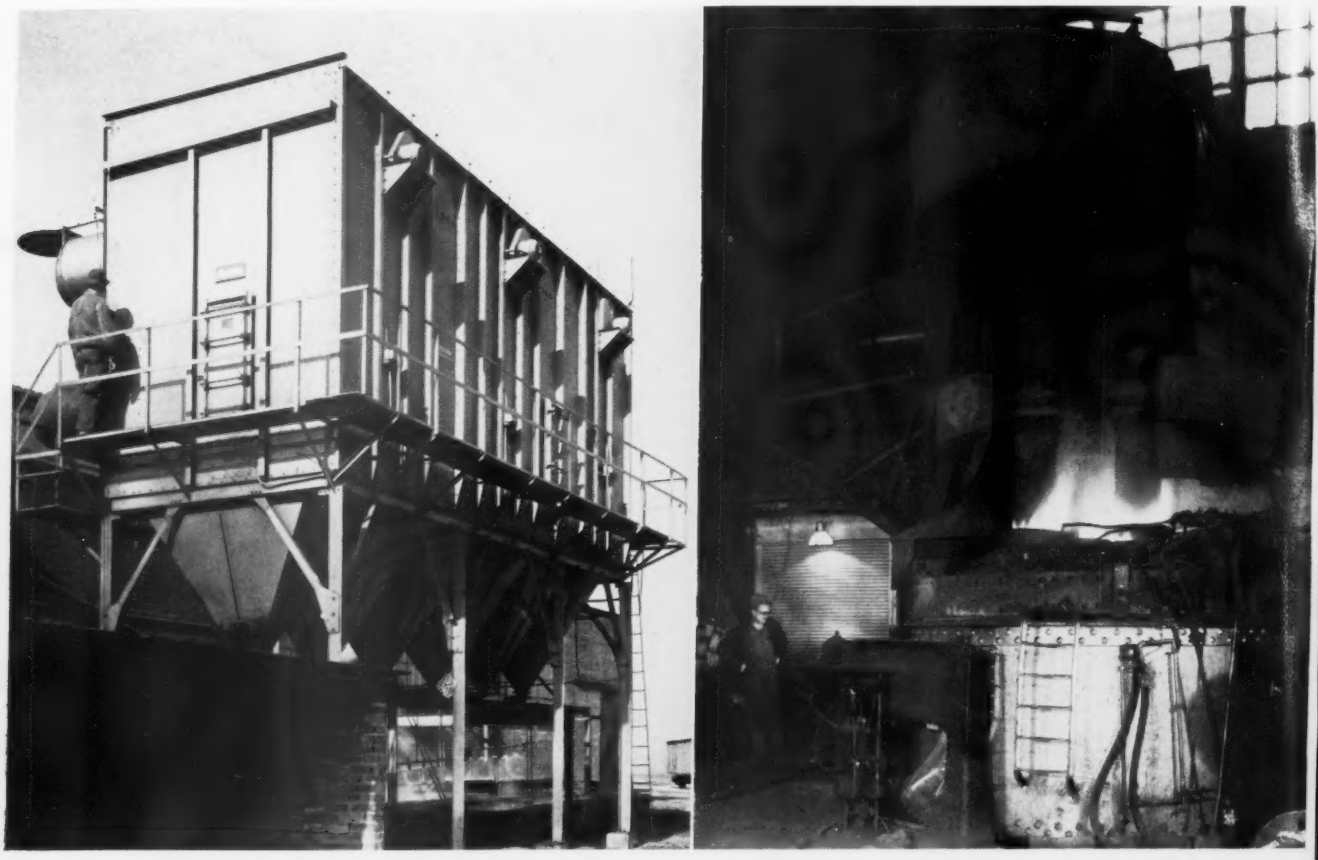
DIVISION OF SIMONDS SAW AND STEEL CO., FITCHBURG, MASS. • OTHER SIMONDS COMPANIES: SIMONDS STEEL MILLS, LOCKPORT, N.Y., SIMONDS CANADA SAW CO., LTD., MONTREAL, QUEBEC AND SIMONDS CANADA ABRASIVE CO., LTD., ARVIDA, QUEBEC

pioneering developments keep **DUSTUBE**® *first in dust control*



Why 5 Tons of Electric Furnace Fume Did Not Settle In Chicago This Week

High Efficiency Dustube® Collector Solves Air Pollution Problem

Instead of dispersing into the Chicago atmosphere, five tons of very fine dust and fume are now trapped weekly in this Dustube Dust Collector. That is how one progressive Chicago steel foundry is eliminating air pollution from its two 5-ton electric steel melting furnaces.

After a wet washing system proved ineffective in controlling the dense smoke and fume this foundry, recognizing the efficiency of cloth filtration, installed a Dustube Collector. This unit, handling 20,000 cfm of gas is equipped with tubular Orlon bags with a mechanized shaking device. Conventional hooding over the two furnaces was not feasible due to their use of a turntable and a single set of electrodes. Therefore, the foundry retained a consultant who designed the swivel type overhead hood, shown in the illustration.

Only filtration can be depended upon to yield an effluent gas free from visible solids. And, the modern Dustube Collector with its highly efficient shaking method and unique cell plate design has proved beyond a doubt that electric furnace fume control need not be a problem any longer.

If you want dust or fume collection that is thorough, yet economical . . . that will pay its own way . . . investigate the Dustube today. Send for Catalog 372.

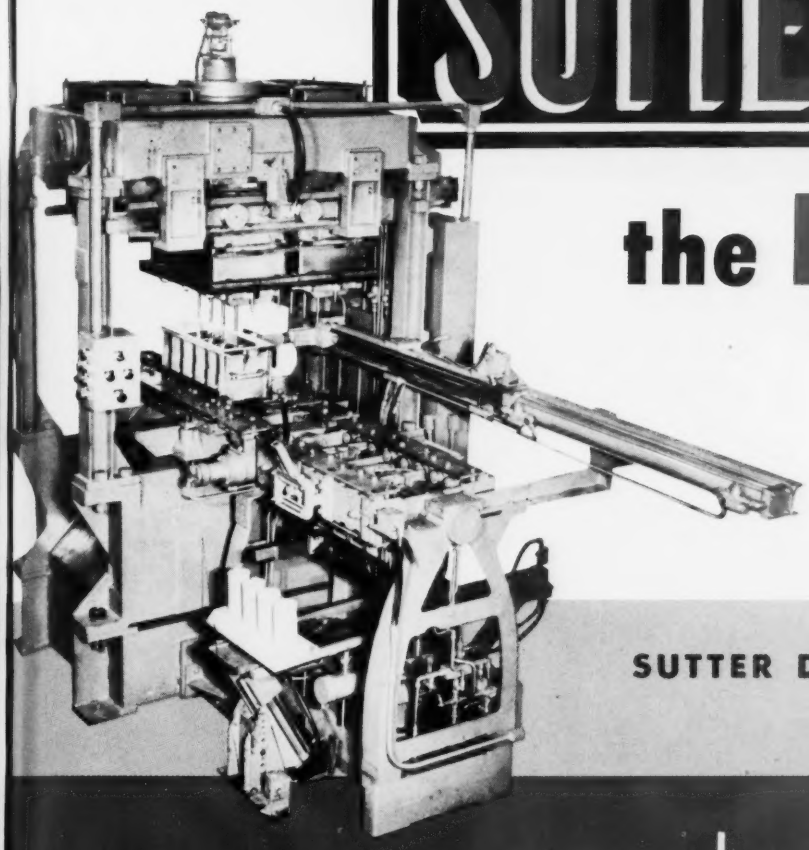
Write for your copy of Catalog 372 today.

American

WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Indiana

dustube® COLLECTORS

SUTTER Introduces the DUAL-HEAD CORE BLOWER



SUTTER DUAL-HEAD "MECHANICORE"

Model SP-221

PAT. PENDING

WILL BLOW TWO DIFFERENT SIZE CORES WITH TWO DIFFERENT SAND MIXTURES

for Amazing Flexibility

Here is flexibility that means easy scheduling of daily production. With the Sutter Dual-Head "Mechanicore" three different schedules can be achieved. First, using both heads for the same core, production can be substantially increased. Second, full production can be maintained on two different cores—even with different sand—simultaneously. Third, since it can also be used as a single head blower, on either head, production can be switched from one core to the other with a moment's notice . . . no daily shut-down is needed for split runs. All this versatility without the cost of two complete conventional core blowers.

UP TO 400 BLOWS PER HOUR

for Startling Core Output

Astounding output is accomplished by unique design which provides two refill stations . . . while one head is blowing the other is refilling. This not only saves time and minimizes wear, but assures adequate refill time without penalizing the operating cycle.

The entire cycle is completely automatic. Aside from pushing the start button, operators simply position dryers on blown cores and remove the drawn cores.

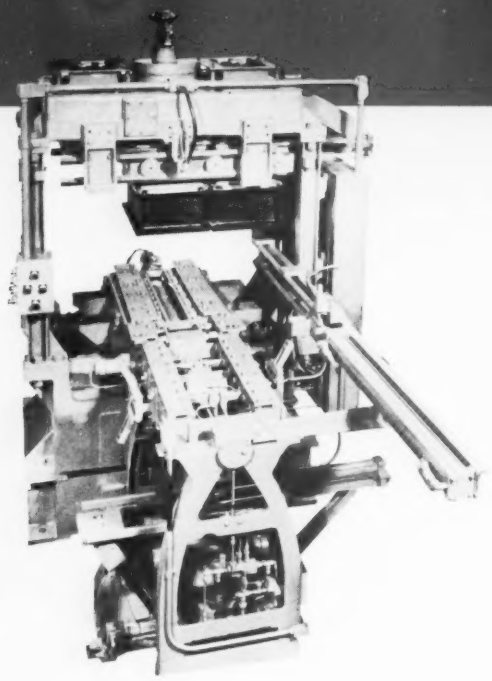
Automatic operation of the Sutter "Mechanicore" results in uniform, high quality cores that meet today's rigid requirements. Too, automatic operation permits unskilled operators to maintain peak production without any reduction in quality.

SUTTER PRODUCTS COMPANY • 2005 Westwood Ave., Dearborn, Michigan

SEE MORE FACTS—Next Page

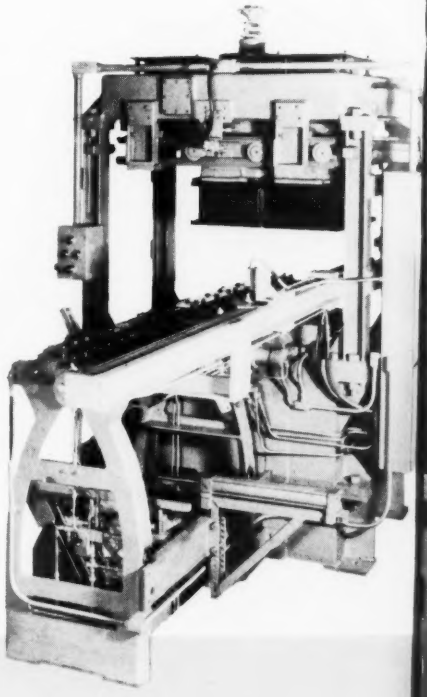
The SUTTER DUAL-HEAD "MECHANICORE"

Features | Automatic Cycle Advanced Design



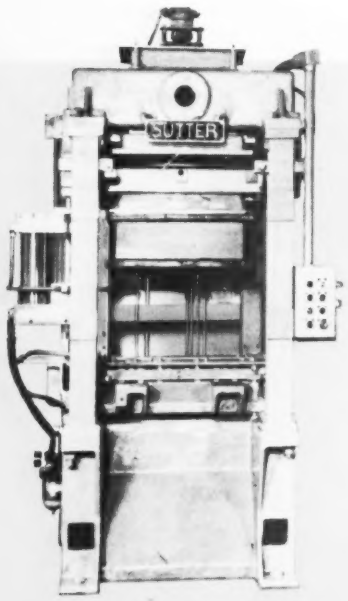
Shown here is the Sutter "Mechanicore" Model SP-221 Automatic Core Blower with double heads, the Sutter Automatic Double Rollover Core Draw Machine with push-out device and the Sutter Automatic Transfer device which moves the blown cores from the blower to the draw machine. This is only one of many set-ups possible. For example: two draw machines can be utilized, one on each side of the blower, or a "merry-go-round" (indexing arrangement) can be installed. With any of these set-ups, one core can be blown while another is being drawn.

Core boxes have been removed to show the unique design and rugged construction. Note, too, the compact location of all components.



This is another view of the same set-up. In actual operation, the head on the right side would be filling while the head on the left is blowing. Then both heads would move left, one blowing and one filling. This design with two refill stations eliminates the return shuttle stroke.

Model SP-221 maximum core box size—36″ long x 15¾″ wide x 12″ deep, maximum core weight—125 lbs.



SUTTER "MECHANICORE" Model SP-220
Automatic Core Blower with one head

This core blower and all Sutter blowers are constructed of cast iron and steel with hardened and ground guides and bushings for dependable operation and long life. It embodies all the advanced design and construction advantages of the SP-221 blowers above.

An important feature is the integral air reservoir which assures an even air supply and firm sand blow at all times without extra tanks and lines.

Accurate core box and blow plate alignment is always maintained.

Maximum core box size is 36″ long x 20″ wide and 12″ deep, maximum core weight—125 lbs.

WRITE FOR YOUR FREE TECHNICAL BULLETIN TODAY.

Exclusive United States Representative
FREDERIC B. STEVENS, INC.
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Exclusive Canadian and Overseas Manufacturer and Distributor
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SUTTER PRODUCTS COMPANY

Creators of foundry equipment with NEW productivity

2005 WESTWOOD AVENUE • DEARBORN, MICHIGAN

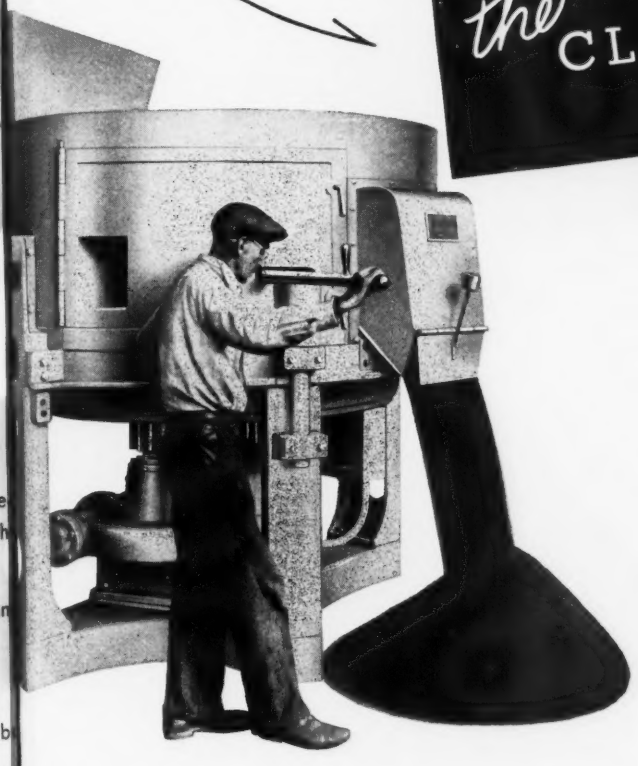
FOR

greater speed

IN

sand mixing

the CLEARFIELD MIXER



The Clearfield Mixer offers you increased speed and thoroughness in sand tempering because of its unique revolving pan and vertically rotating muller principle of operation. Because the mullers are stationary in the horizontal plane they exert a twisting, sliding movement on the sand which rubs or smears the bond on the grains of sand. This action substantially reduces the tempering period and results in sand that is thoroughly and uniformly bonded.

Clearfield Mixers are available in capacities to meet any sand preparation need. Write today for Catalog No. 83 for details.

CLEARFIELD
MIXER

MIXES, TEMPERS
AERATES

CLEARFIELD
MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U.S.A.

NOW

FOR THE MEDIUM SIZE FOUNDRY

NEW! No. 1 MODEL F SIMPSON MIX MULLER

Versatile No. 1 Model F prepares 50% More Sand . . . Offers outstanding value per dollar invested.

Here's news if you are looking for a moderately priced muller . . . one that provides real control in producing up to 8 tons per hour.

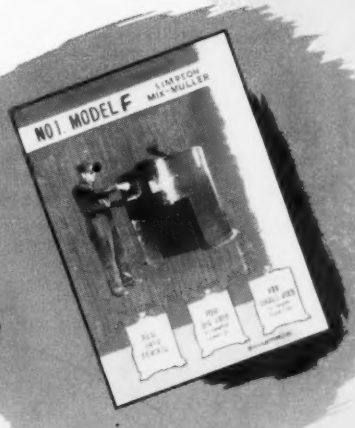
The many features—features heretofore unavailable in medium priced mullers are listed at right—Here's what they mean to you:

The No. 1 Model F Simpson Mix-Muller was specifically designed to provide the medium sized foundry with a 500 pound batch Mix-Muller incorporating the latest mechanical features and styling available.

The No. 1 Model F offers improved versatility for preparing all types of sand. Till now only available in larger models:
SPRING LOADED MULLERS ALLOW QUICK ADJUSTMENT OF EFFECTIVE PRESSURES FROM BATCH TO BATCH.

Traditional Simpson ruggedness, *foundry established* improvements in ease of operation and maintenance are now available in this economical unit that:
WEIGHS LESS, AND IS MORE COMPACT.

Let a NATIONAL engineer show you more about the new No. 1 Model F Simpson Mix-Muller—see for yourself how this revolutionary new muller compares price-wise and performance-wise with any comparable unit in its price or capacity range—Write or phone for details.



WRITE FOR BULLETIN 516
ON THE NEW NO. 1 MODEL F MIX-MULLER

MORE MULLING FOR YOUR MONEY!
These features insure LOW OPERATING COSTS

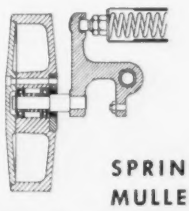
1. **COMPACT** integral base fully encloses drive; permits ease of installation . . . no foundations required.

2. **SAFE**, positive sand sampler eliminates dangerous dipping into muller during preparing Cycle. High crib and dust cover (not shown in photo) fully enclose your sand preparing operations.

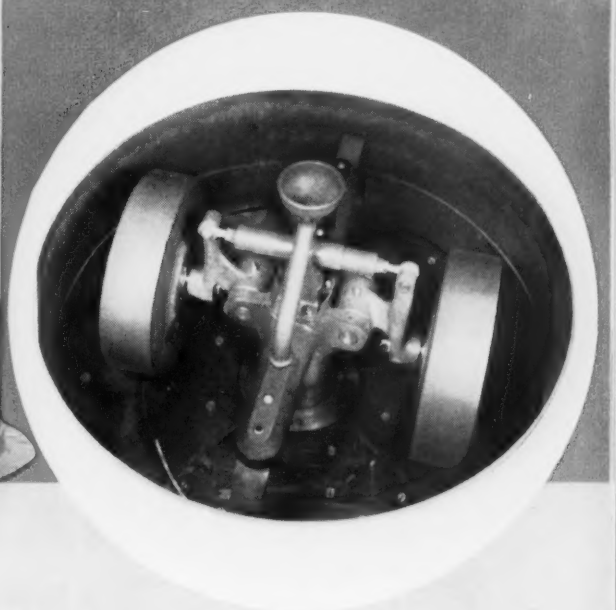
3. **QUICK**, direct arrangement of funnel speeds liquid additions (through plow beam) directly to path of mullers—no splashing over interior parts, tempering time cut to absolute minimum.

4. **CLEAN** Crib scraper (no extra cost) sweeps periphery clean with each revolution of crosshead.

5. **SMOOTH**, shock-free operation with modern, entirely enclosed V-Belt drive. Standard 7½ H.P. Motor. All gears operate in oil.



6. **SPRING-LOADED MULLERS.** Like the larger No. 2 and 3 Model F, the new No. 1 Model F Mix-Muller now offers full control over Mulling pressures. Mullers weigh but 200 lbs., yet can exert up to 500 lbs. pressure. Adjustment quickly made.



National Engineering Company
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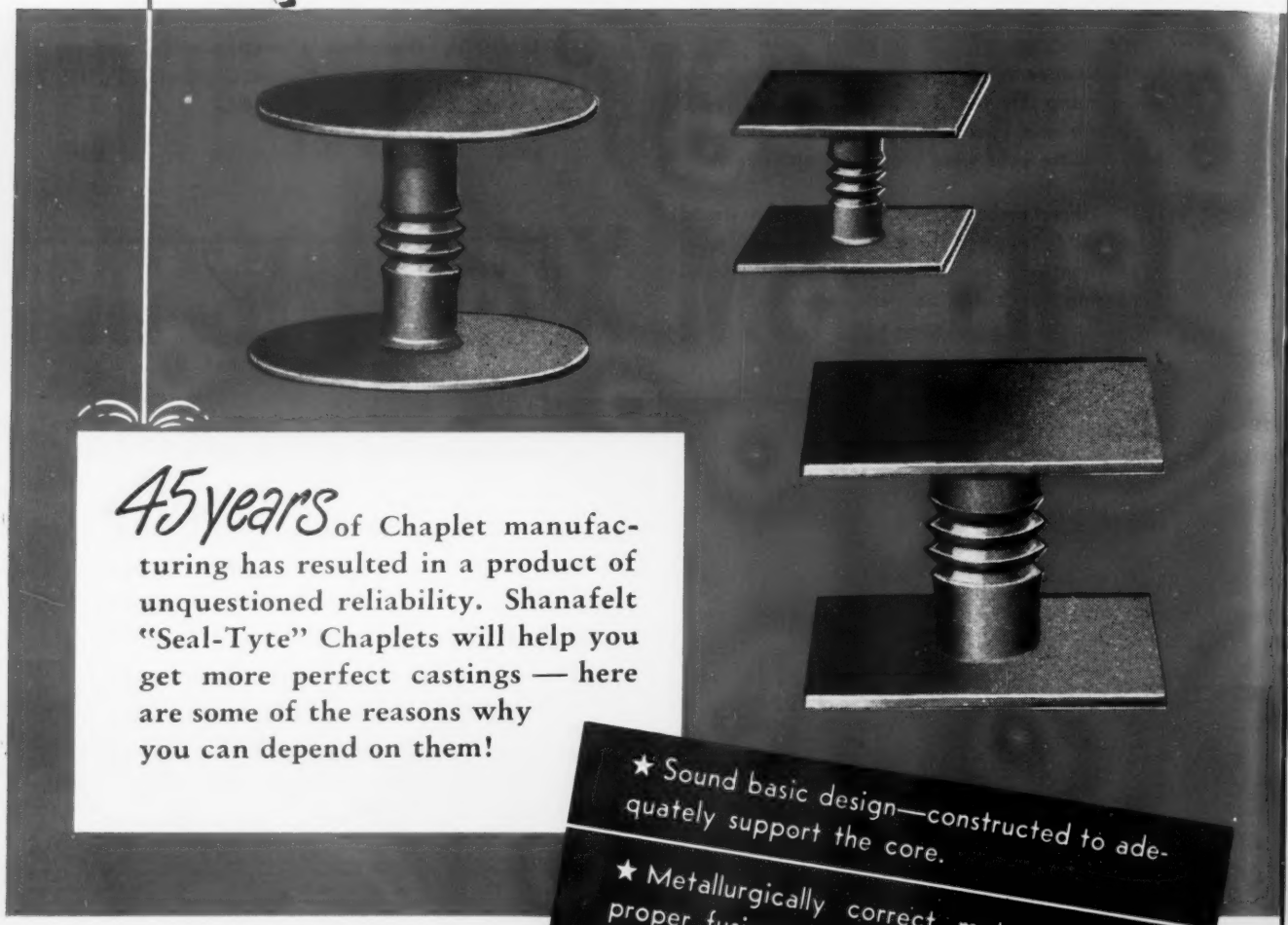
646 Machinery Hall Bldg. • Chicago 6, Illinois

SIMPSON
Intensive
MIX-MULLERS

Products of the Practical Foundryman

Always Dependable



45 years of Chaplet manufacturing has resulted in a product of unquestioned reliability. Shanafelt "Seal-Tyte" Chaplets will help you get more perfect castings — here are some of the reasons why you can depend on them!

★ Sound basic design—constructed to adequately support the core.

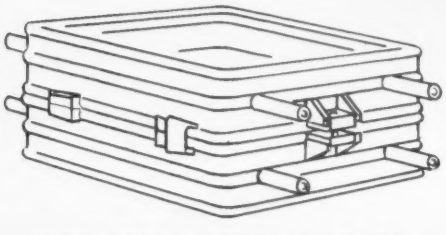
★ Metallurgically correct materials mean proper fusing, with special fin edge stems for pressure tight work.

★ Careful manufacturing and inspection assures uniformity in size and quality.

We specialize in double heads and carry a large stock for immediate delivery of most sizes. Your orders or price inquiries will always receive prompt attention.

The SHANAFELT Manufacturing Co.

ESTABLISHED 1893 — 2600-2700 WINFIELD WAY, S. E. • CANTON, OHIO



ONE PIECE STEEL FLASKS

The Shanafelt Flask is strong, accurate, and long wearing, yet light in weight for easy handling.

Shanafelt hardened Steel Flask Pins and Bushings are made to the standards required for most efficient Flask handling.

Your inquiries will receive immediate attention from the home office in Canton, Ohio or from our representative in your district.

FLASKS PINS AND BUSHINGS

There is no substitute for *Highest Quality*

THERE are high quality MACKLIN Grinding Wheels for all kinds of floor stand, swing frame and portable operations.

Specify MACKLIN Grinding Wheels to give uniform results for all your foundry jobs. Tried and proved over many years, they will give you cost saving results and "Protect Your Production."

Long experience, with competent engineering and research facilities, at Macklin, have provided the best grinding wheels for all types of Foundry grinding requirements.

ASK FOR THE SERVICES OF A MACKLIN FIELD ENGINEER.

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Manufacturers of GRINDING WHEELS AND OTHER ABRASIVE PRODUCTS

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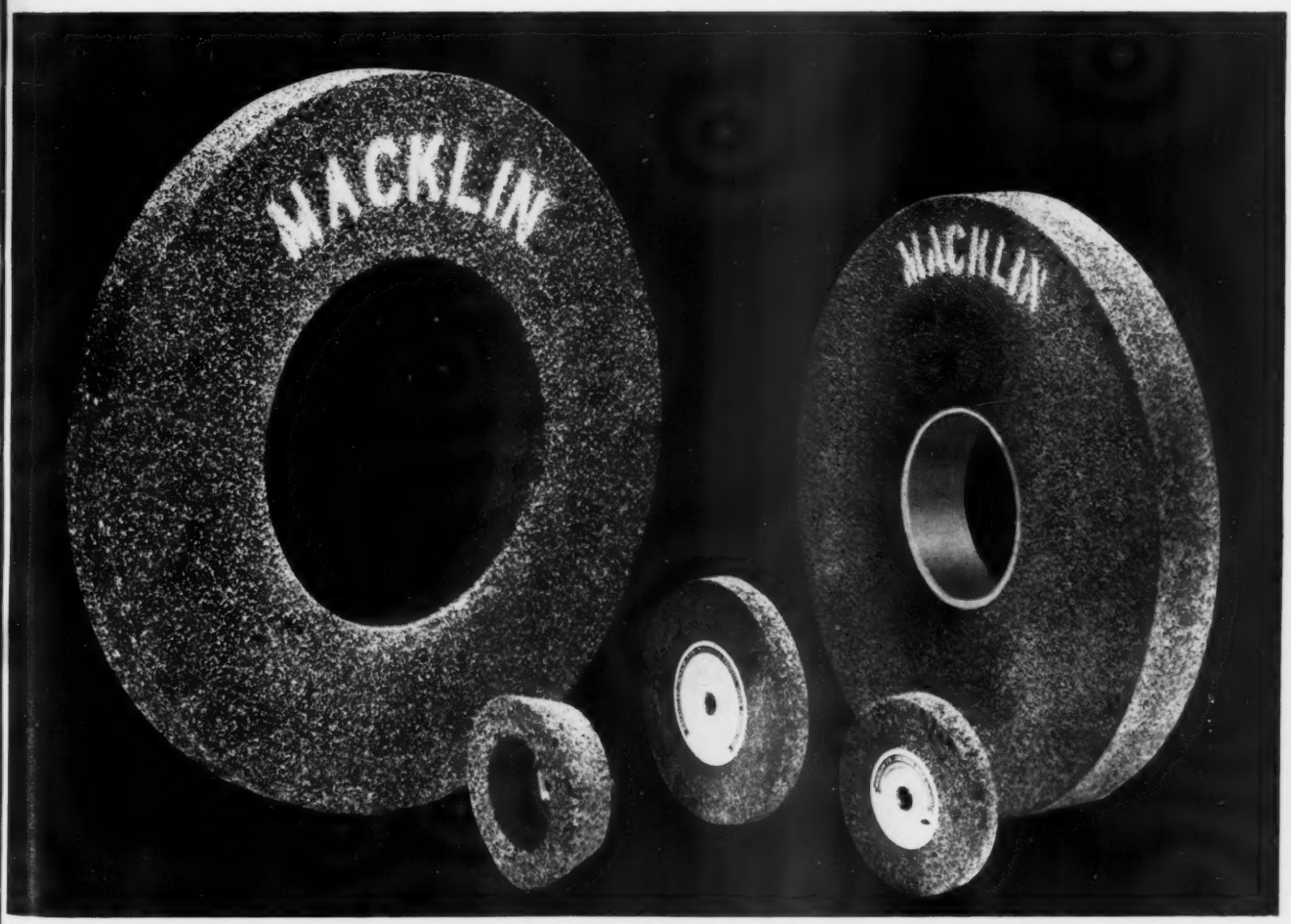
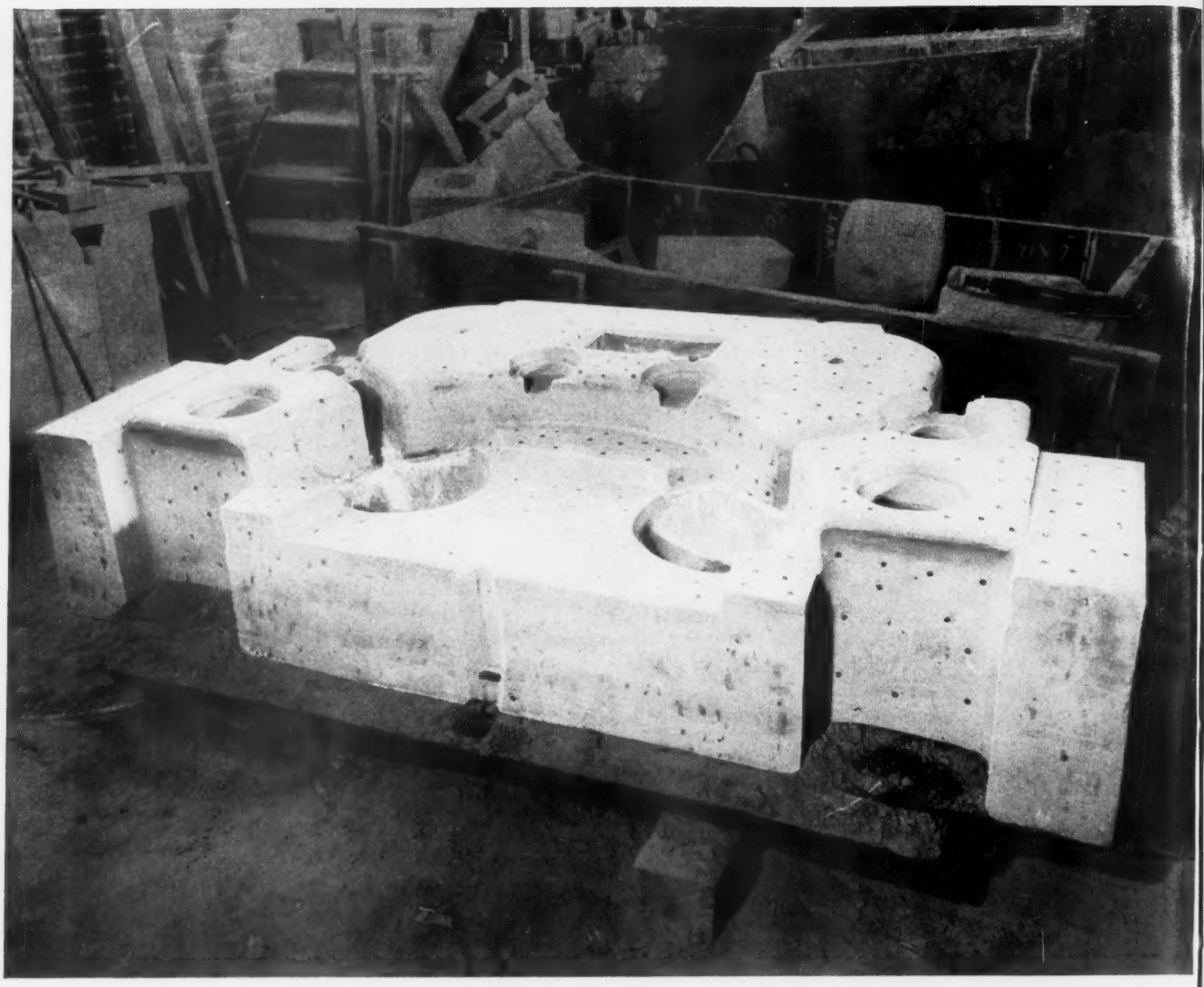
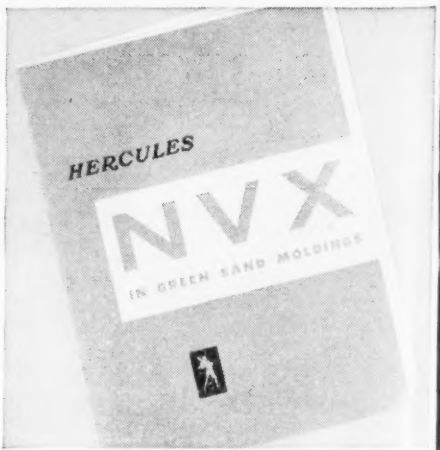




STEEL FOUNDRY CUTS CORE BAKING TIME 50% WITH TRULINE® BINDER IN THE MIX

This huge core, with its thick cross sections, would have required two nights or more for baking with core oil in the mix. By using Truline Binder instead, it was thoroughly baked overnight. Faster baking is just one advantage of Truline-bonded cores. They also mean less gas at pouring time . . . sounder steel castings. Cores collapse easily, helping to eliminate cracked castings. Send for technical data on Truline Binder. Our foundry service men will be happy to show how it can save you time and money.



NVX for improving the quality of molding sand and castings is another Hercules product serving steel foundries. Detailed information and technical data on NVX are contained in this 12-page book. Write Hercules for your copy.

Naval Stores Department

HERCULES POWDER COMPANY

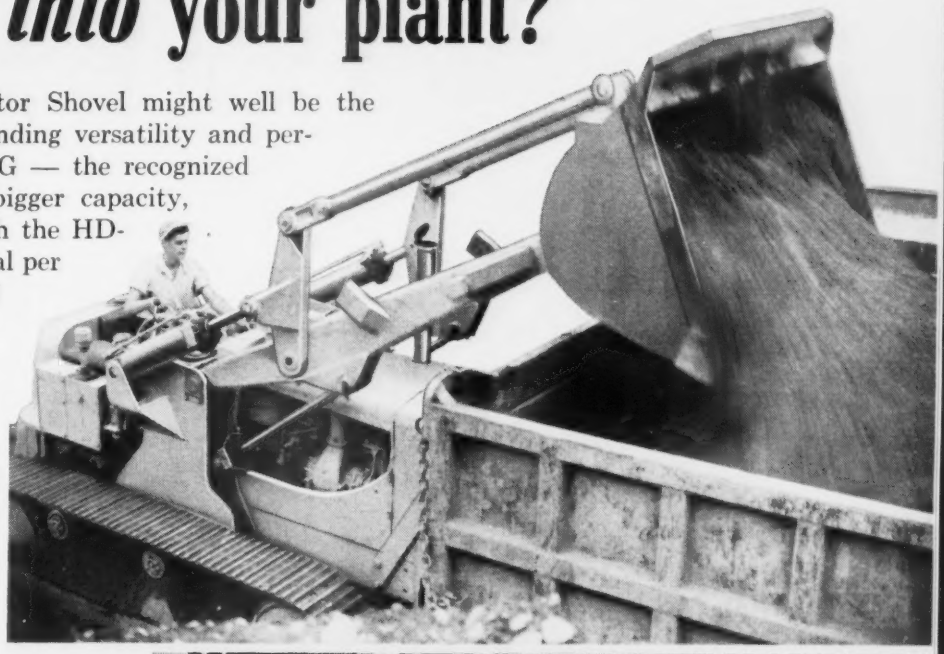
INCORPORATED

920 King Street, Wilmington 99, Del.

MR. PRODUCTION MANAGER:

are you looking for a way to feed more output capacity *into* your plant?

This Allis-Chalmers HD-9G Tractor Shovel might well be the answer. It offers the same outstanding versatility and performing ability as the 1-yd. HD-5G — the recognized standard of comparison — *plus* bigger capacity, higher reach and more power. With the HD-9G, one man can move more material per shift . . . handle a wider variety of jobs inside and out.

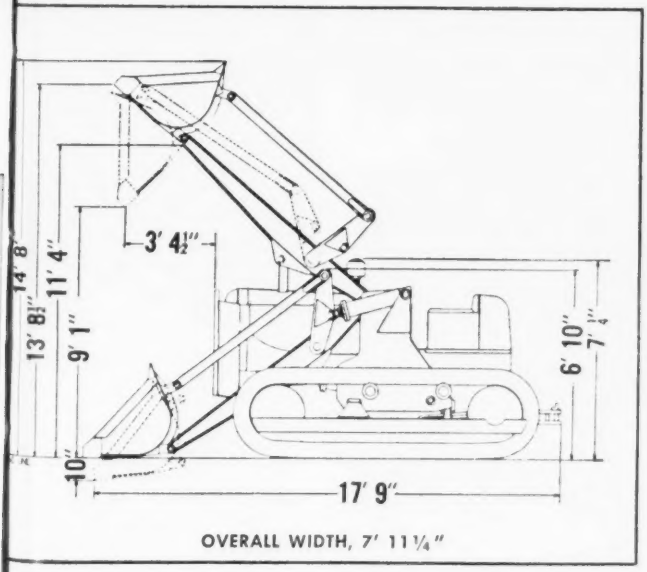


loads fast with big two-yard bucket

The HD-9G digs, stockpiles, loads trucks, feeds hoppers — handles any bulk material two big yards at a scoop. Special 3½-yd. light materials bucket almost doubles output in materials weighing not more than 1400 lb. per cu. yd. Exclusive Allis-Chalmers shift pattern further speeds loading by allowing operator to go from low forward to fast reverse with one simple gear shift.

high dumping height — 11 ft. 4 in. Under Bucket Hinge

Here is a Tractor Shovel that reaches for extra jobs. With bucket fully raised, it dumps into high bins. Also, tractor can work right up on storage piles, making it possible to put many more yards of material in a given area.



OVERALL WIDTH, 7' 11¼"

works in close quarters — No Bulky Superstructure

Compact design, plus the ability to turn in its own track length enables the HD-9G to work in confined areas or where there is little more than tractor-height head room.

powerful — 72 brake hp.

The HD-9G has the power, weight and traction to handle tough excavating on new construction, maintain yard roads and parking lots, spot railroad cars, lift, carry, push or pull heavy loads of all kinds.

Ask your Allis-Chalmers Dealer to show you the many ways this HD-9G has helped others step up production.

ALLIS·CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

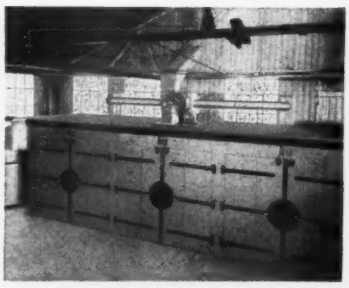
A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

LANLY FOUNDRY OVENS

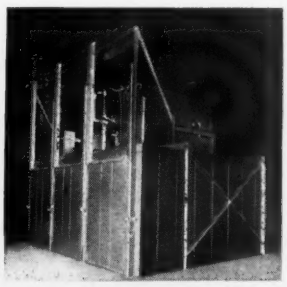
The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

Upon receipt of information covering your needs, we will submit a proposal for an oven that will be thoroughly guaranteed as to construction and performance.

LANLY CAR TYPE OVEN featuring fast, uniform drying with low fuel consumption. Complete automatic operation. Sturdy construction yet pleasing in appearance. Comparative low initial cost.

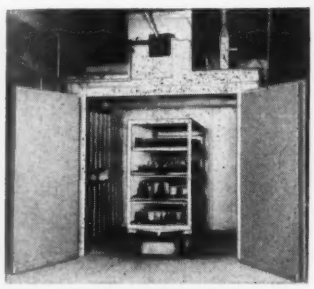


Three Compartment Rack Type Oven



3 Compartment Rack Type Oven

Continuous Core Blacking Oven



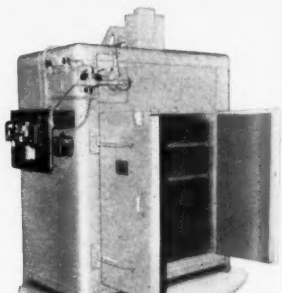
De-waxing Oven

Combination Rack and Drawer Type Oven

Plaster Mold Drying Oven

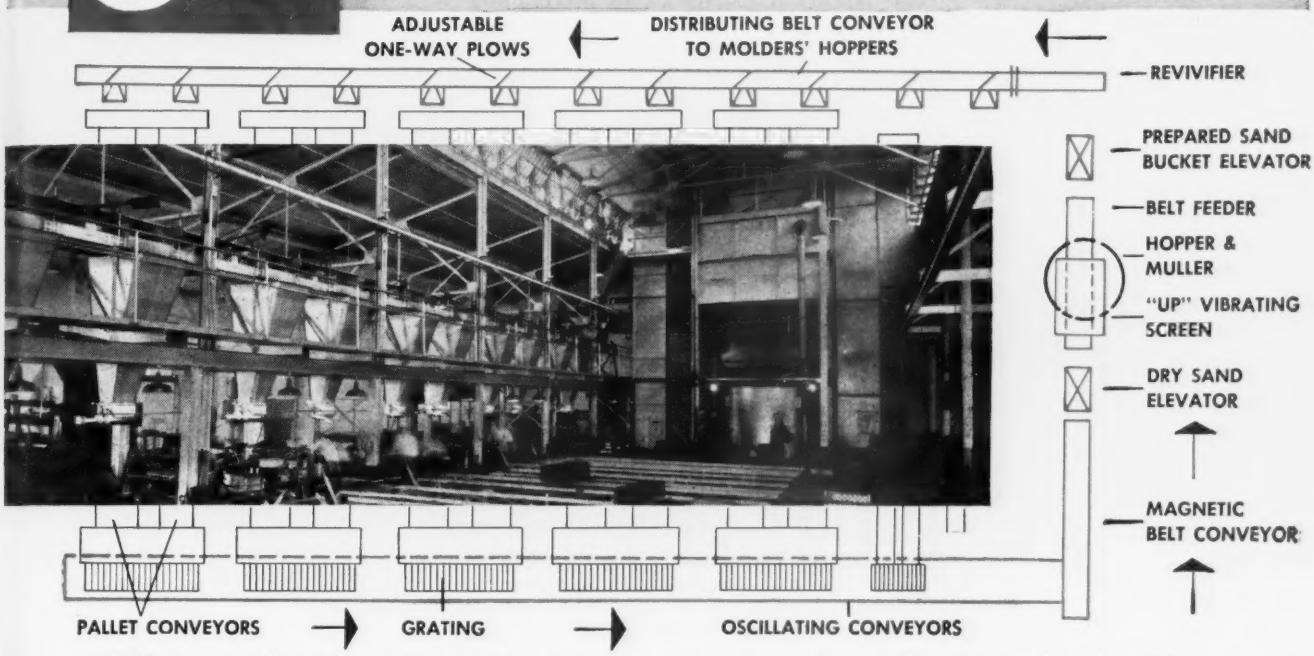
LANLY FOUNDRY OVENS
THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO

WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION



Shelf Type Core Oven

3rd M-M sand handling system mechanized by Link-Belt



Molds are automatically dumped from pallets by a counter-weighted discharge mechanism onto gratings for separation of sand and castings—pallets and bottom boards then automatically returned to molders. Sand passes through grating to an oscillating conveyor. Magnetic separation and screening of shakeout sand accomplished prior to sand preparation. Prepared sand distributed by belt conveyor system to molder's hoppers.

Minneapolis-Moline modernizes for better castings at lower cost

WHEN you mechanize your foundry, you can be *sure* it will pay off. And when Link-Belt does the engineering, you're doubly sure.

Witness the experience of Minneapolis-Moline Co. Several years ago they called in Link-Belt to modernize a light casting foundry. Two years later they wanted to step up production of heavy castings. Again Link-Belt was consulted.

Now, for the third time, Link-Belt has served Minneapolis-Moline. Their new sand handling system adds efficiency, improves working conditions, makes possible better castings at lower cost.

If you're contemplating a new foundry—or modernization of existing facilities—call in a Link-Belt foundry engineer. He'll work with you—help you obtain the best layout and equipment for your requirements, whether your foundry is large or small.

LINK-BELT

CONVEYORS and PREPARATION MACHINERY

In a tunnel under shakeout grates, two Link-Belt Oscillating Conveyors collect hot sand. All-metal construction, with leak-proof troughs, makes these conveyors ideal for foundry duty.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13,432

SITUATION UNDER CONTROL — BY KEOKUK

CHIEF KEOKUK:

"Ugh! Heap smart little chief. I say, Rub sticks to start fire. Him rub MATCH sticks!"

Pprincess WENATCHEE:

"Yes, Junior has everything under control!"

KEOKUK ELECTRO-METAL COMPANY

KEOKUK, IOWA

WENATCHEE DIVISION, WENATCHEE, WASHINGTON

Keokuk Silvery . . . the superior form of silicon introduction for steel plants and foundries . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

There's just no match for Keokuk Silvery Pig Iron to control quality and costs. *Due to its exact, uniform analysis, Keokuk assures less waste resulting in greater economy.* Car for car, pig for pig, its uniformity *never* varies. Charge Keokuk by magnet or count!

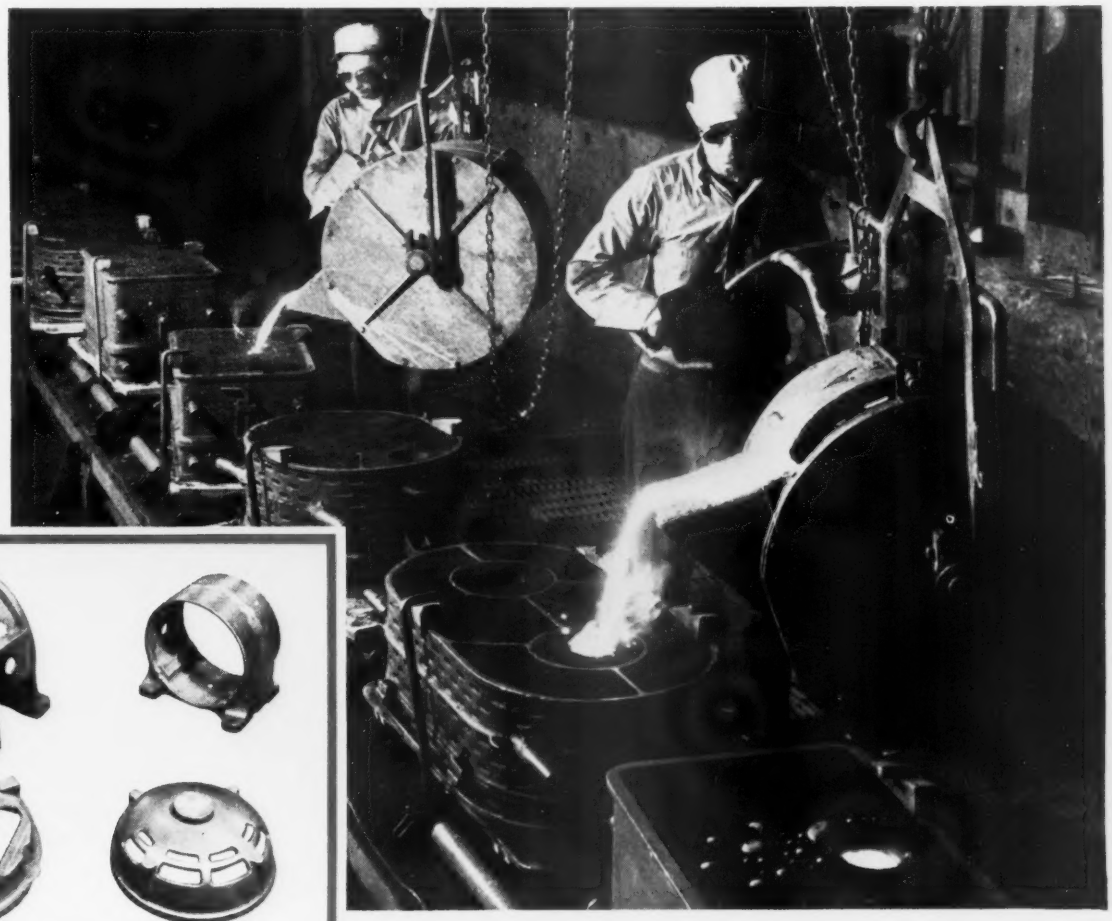
SALES AGENT: MILLER AND COMPANY

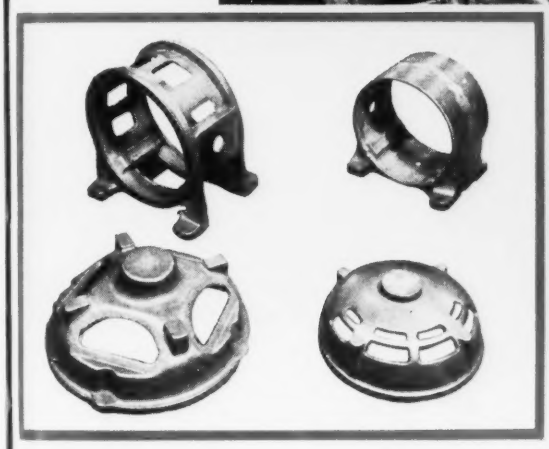
332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
407 N. Eighth St., St. Louis 1, Missouri

Here's why

Westinghouse uses Neville Pig Iron

For Motor Castings





The housings and other important components of electric motors are often made from gray iron. They must be cast to close tolerances—and often in intricate designs—and provide durability and protection in all kinds of punishing service. That calls for gray iron of exceptionally high quality—with close grain and high fluidity in casting. The Trafford, Pa. Foundry of Westinghouse Electric Corporation regularly uses Neville Pig Iron to meet these requirements in making many of the gray iron parts for famous Westinghouse motors.

NEVILLE
Quality Pig Iron for the
Foundry Trade

PIG IRON DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

W&D 5064

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

MAY-FRAN HINGED-STEEL BELT IS DESIGNED TO HANDLE HOT, HEAVY AND ABRASIVE CASTINGS

Only the most rugged belt could take the punishment MAY-FRAN Hinged-Steel Belting will take day and day out. Its unique design and sturdy construction enable it to handle hot, heavy and abrasive castings that quickly disintegrate ordinary belting.

MAY-FRAN Belting is assembled from heavy gauge hinged-steel links by high-carbon steel rods. Side chains become an integral part of the belt, and outside links incorporate interlocking wings which remain positively engaged at all times.

Even when belt travels from one level to another or over conveyor sprockets, wings will never separate.

MAY-FRAN Hinged-Steel Belting can be furnished to your specifications in widths from 6 inches to 6 feet and in any length or carrying capacity. Either solid or perforated links are available in 2½, 4, 6, 9 and 12-inch pitch lengths.

For maximum service with minimum upkeep, specify MAY-FRAN Hinged-Steel Belting!

Write today for complete information

MAY-FRAN

DESIGNERS AND BUILDERS OF COMPLETE HANDLING SYSTEMS

ENGINEERING, INCORPORATED

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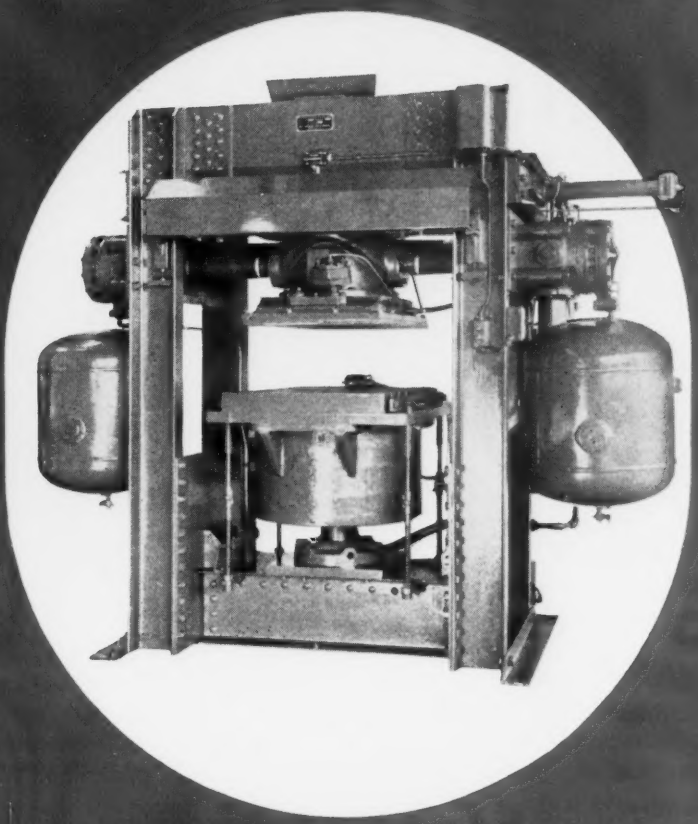
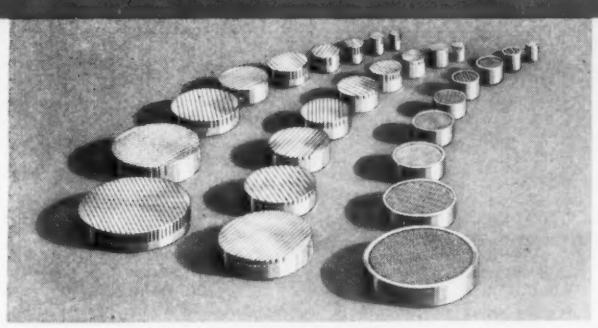
There is no substitute for the skill and knowledge of experience

DEMMLER has been manufacturing Core Blowers exclusively since 1911



for "D" process
—the DEMMLER 104E
CORE BLOWER

Experience takes time, but it is important to the watchmaker, the doctor – or to engineers who design your core blowers. The Model 104E is another Demmler "first" designed to fit the latest ideas in foundry methods — D-process shell molding. It typifies design leadership based on 45 years of experience — the longest in the industry. The 104E gives close tolerances and sharp detail on shell molds, and can also be used for regular core blowing. Write for information about this latest Demmler leader.



Demmler Precision Core Box Vents

It is logical, too, that the best place to buy core box vents is from Demmler. Brass slotted, steel slotted and screen types in sizes to meet every application.

Write for Literature

Wm. Demmler & Bros.

Kewanee, Illinois

WANT A *Squeezer* YOU CAN PUT ON THE SPOT?

WE *mean the top-speed, high-production, don't-let-me-down spot!* That calls for a Tabor Yoke-Type Jar Squeezer. And that's why you're apt to find from one to a battery of these machines wherever castings are made. Foundrymen know a good investment when they see it!

Here's Tabor design at its best, giving foundrymen everything they look for in a Squeezer: steady, uniform squeeze—ease and speed of operation—long life and low upkeep.

Practical design? Just check these five features:

1. Squeezing unit, including guide, is completely enclosed—full protection against dirt and dust.
2. There are no piston rings on the squeeze mechanism—a source of down-time and maintenance expense gone.
3. Wear on squeeze cylinder is so reduced that it won't be necessary, within the conceivable life of the machine, to re-bore or replace this part.
4. It's now impossible, under any circumstances, for the squeeze piston to blow out—a vital safety factor.
5. Entire squeezing or jarring unit may be quickly detached from the machine for easy inspection.

You'll agree there's something good here for you. The machines are in stock. We invite your inquiry.

Diam. Squeeze Cylinder	Table Size	Space Between Uprights
10″	18″ x 20″	32″
13″	18″ x 24″	36″

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

The TABOR *Manufacturing Co.*

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

Have You a Fortune Tied Up in Dead Core Storage Space?

Free it with Allis-Chalmers Dielectric Sand Core Dryer

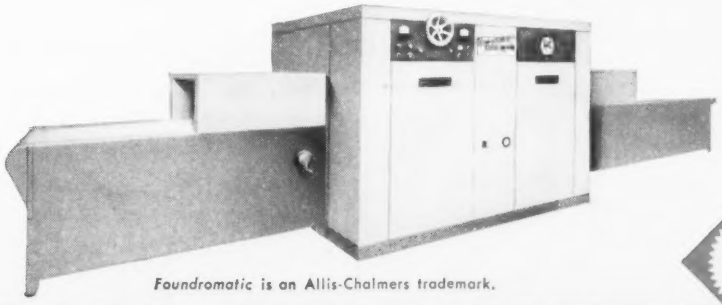
Many foundries are wasting hundreds of feet of valuable floor and shelf space by storing cores. If this is the problem in your foundry, why not eliminate it?

Make cores only as you need them with a *Foundromatic* sand core dryer. There is no necessity for storing cores when you use the *Foundromatic* dryer. Cores are dried in minutes instead of hours. When they come out of the dryer they are cool enough to handle barehanded, and are ready for the molder. You can cut the time from core maker to molder from hours (or days or months) to minutes.

OTHER ADVANTAGES

Best of all, make better cores than before. This method completely eliminates burned or overbaked cores. Fuel savings may be as much as 60% because all the heat goes into the core.

Find out what the improved *Foundromatic* dryer can do for your foundry. Call your nearby A-C district office for specifications showing new high capacity, or send coupon.



Foundromatic is an Allis-Chalmers trademark.

ALLIS-CHALMERS

FOUNDROMATIC
Dielectric
SAND CORE DRYER

QUESTIONS and ANSWERS
About Dielectric Sand Core Drying

1. What is typical drying time for a core using the* Foundromatic *dryer?
A core that used to take 70 minutes to dry in a conventional oven, is dried in a *Foundromatic* dryer in as little as 3 minutes.

2. How big a core can be dried in the* Foundromatic *dryer?
Cores up to 400 pounds are being dried successfully in daily production. In fact, any core that will pass through an aperture 36 inches wide and 13 inches high can be dried.

3. What about collapsibility?
Resin bonded cores have very good collapsibility, contributing to a faster, cleaner shakeout.

4. How much maintenance is there?
Very little. Periodic replacement of tubes; oiling of rollers, and conveyor and blower motors.

5. How long will tubes last?
Tubes have an estimated life of 5000 hours.

6. Do I need an electronic engineer to help me with the* Foundromatic *dryer?
No. Once equipment is installed and operating, any personnel can be quickly trained to follow simple operating instructions.

SEND

Allis-Chalmers
Milwaukee 1, Wisconsin

Please send me specifications on the improved *Foundromatic* sand core dryer.

Name .....

Title .....

Company .....

Street .....

City ..... State A-4098

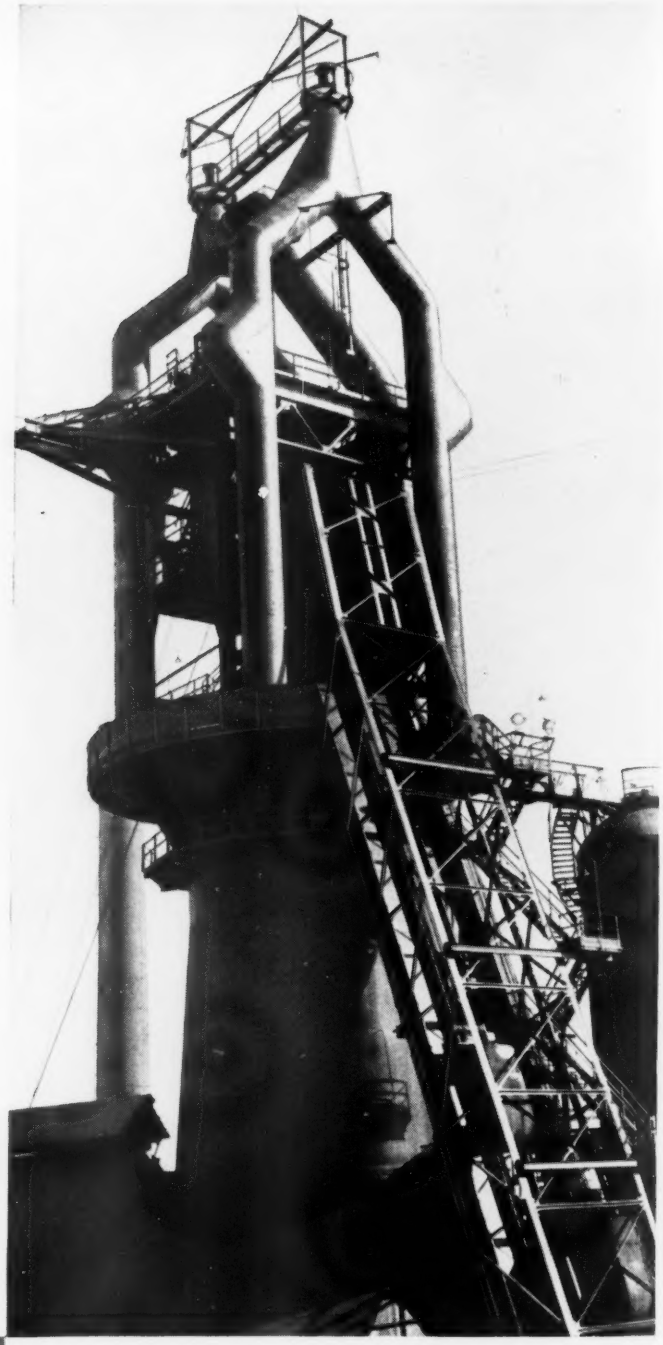
MELTRITE

PIG IRON

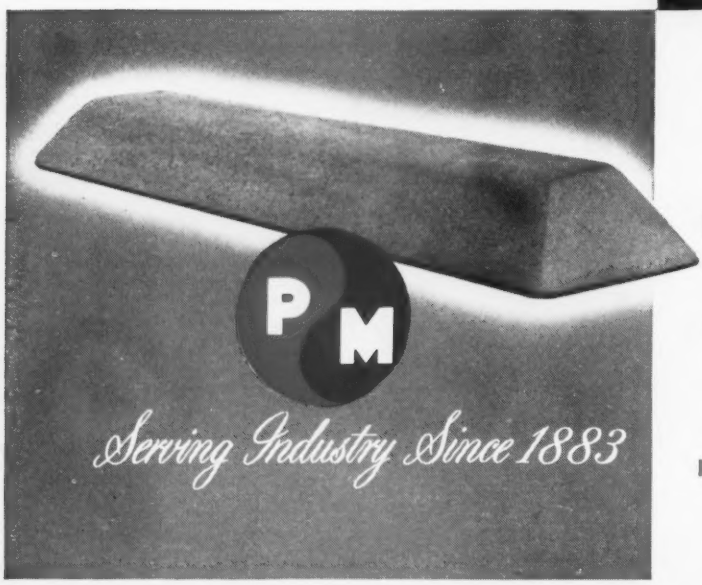
Increased Productive Capacity

To Meet The Needs of Industrial America

MORE USED THAN ANY OTHER MERCHANT PIG IRON



This is the new and larger Federal "A" furnace in the Chicago district—62% increase in capacity over the old furnace. Productive capacity has been increased also at both Toledo and Erie.



Foundry Service Department Available Without Obligation

PICKANDS MATHER & COMPANY

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IRON ORE • PIG IRON • COAL • COKE

How to
increase core production of your present equipment:
...use RESINOX 4846 core binder

You can cut core baking time 35% to 40%, compared to oil-bonded cores . . . increase the capacity of your core baking equipment . . . and get faster, more efficient production, with Monsanto's phenolic core binding resin, Resinox 4846.

This outstanding resin offers these advantages:

1. Remarkably lower fuel consumption per ton of cores baked.
2. Reduction in scrap during handling and storage.
3. Higher baked tensile strength and core hardness.
4. Smoother surfaces; better detail and dimensional accuracy.
5. Lower gas content and lower rate of evolution.

You'll want to investigate Resinox 4846, as well as Monsanto's urea core binders, and the whole series of resins available for shell molding; also Lytron, a new sand conditioner for foundry use. Just use the handy coupon today.

Resinox, Lytron: Reg. U. S. Pat. Off.

LOOK FIRST TO MONSANTO FOR THE LATEST RESEARCH-BUILT, SHOP-TESTED FOUNDRY RESINS

MONSANTO®

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5703, Springfield 2, Mass.

Please send me complete information on:

☐ Resinox 4846 phenolic core binder; ☐ Other Monsanto core binding resins; ☐ Resins for shell molding; ☐ Lytron sand conditioner.

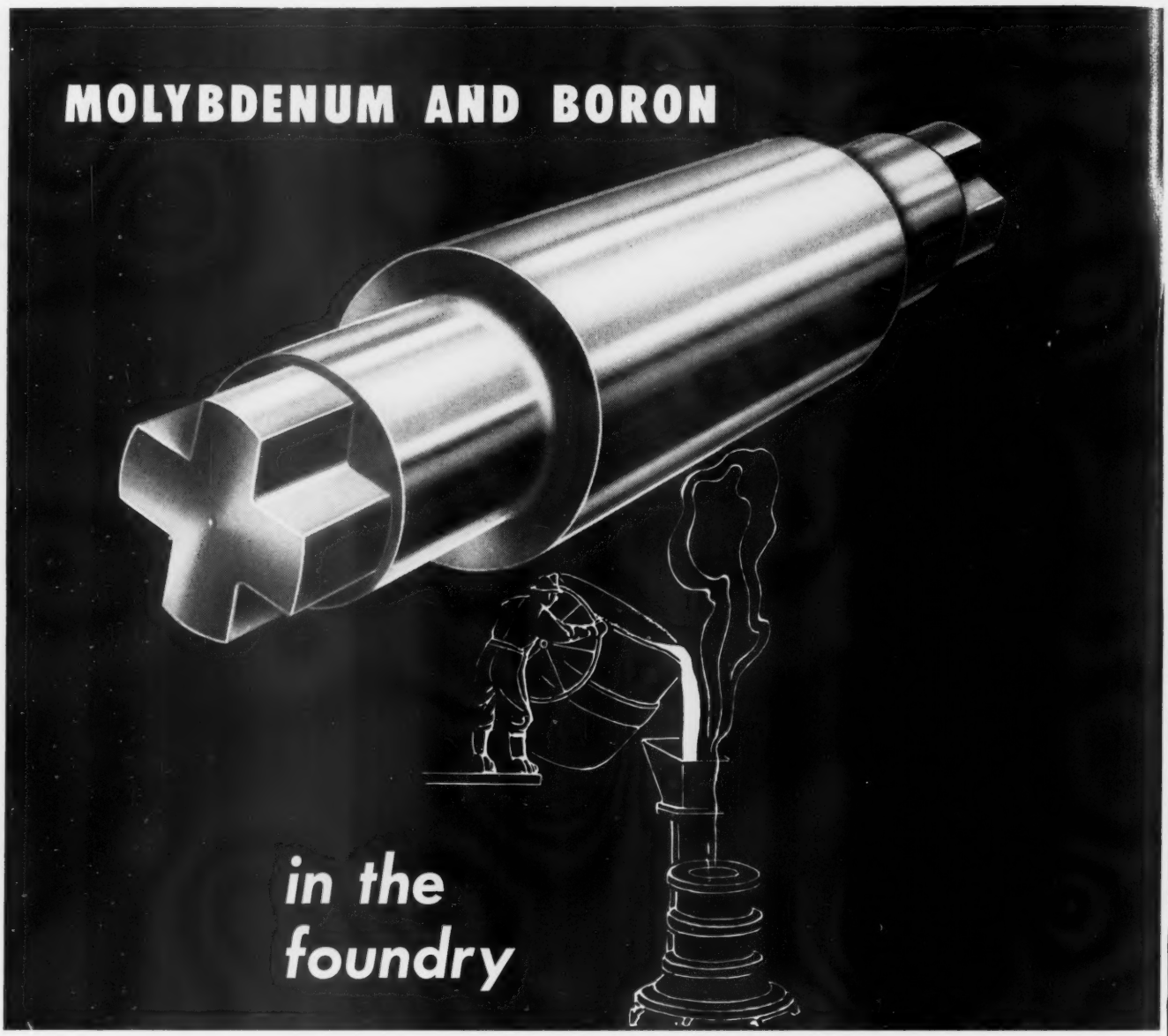
Name & Title _____

Company _____

Address _____

City, Zone, State _____

MOLYBDENUM AND BORON



in the foundry

Rolls are among many cast, wrought iron and steel products that have been improved by Molybdenum and Boron. Very small additions, properly introduced, yield surprising results. MCA Molybdenum additions increase the resistance of rolls to breakage, chipping, heat checking and spalling in service. Molybdenum and Boron improve toughness and hardness qualities at both room and higher temperatures.

Similarly, Molybdenum and Boron are effective in improving toughness and hardness in both light and heavy iron and steel castings.

As recognized authorities in the application of Molybdenum, Tungsten, Boron, Cerium and its derivatives both as alloys and chemicals, MCA assures confidential and immediate reponse to inquiries.

MOLYBDENUM

CORPORATION OF AMERICA

Grant Building **Pittsburgh 19, Pa.**

Offices: Pittsburgh, Chicago, Detroit, Los Angeles, New York, San Francisco
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Subsidiary: Cleveland Tungsten, Inc., Cleveland *Plants:* Washington, Pa., York, Pa.

MCA

HOW TO PUT THE SQUEEZE ON BLAST CLEANING COSTS

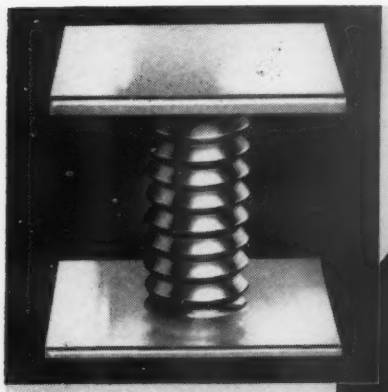
U. S. Patent # 2184926
(other patents pending)

. . . ***USE MALLEABRASIVE, SHOT OR GRIT.*** Scientifically heat-treated for durability, Malleabrasive lasts longer. Laboratory controlled for strength and consistency, Malleabrasive cleans better faster. And because it does a better job in less time with fewer refills, Malleabrasive cleans *cheaper!* See for yourself. Next time you order blast cleaning abrasive, specify Malleabrasive from Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Maryland.

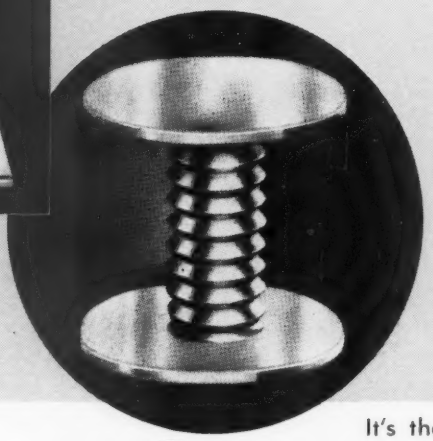
Pangborn DISTRIBUTORS FOR

MALLEABRASIVE®

PANGBORN'S 50th ANNIVERSARY—1904-1954

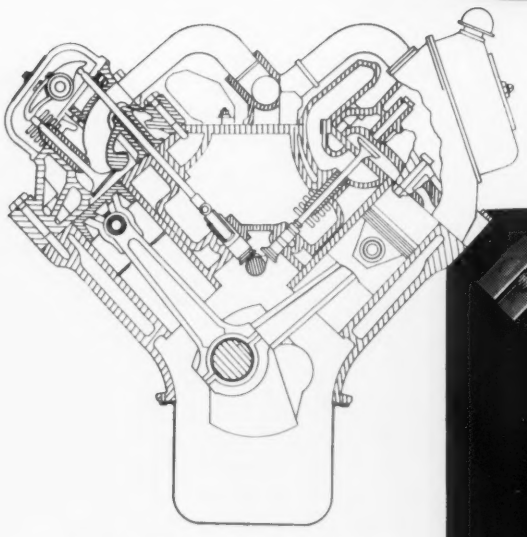


Double Head Thread Stem Chaplets for use on heavier castings. Available in heights for practically any section of metal. Stem diameters range from ⅜" to 1¼". Designs to meet all core and mold conditions.



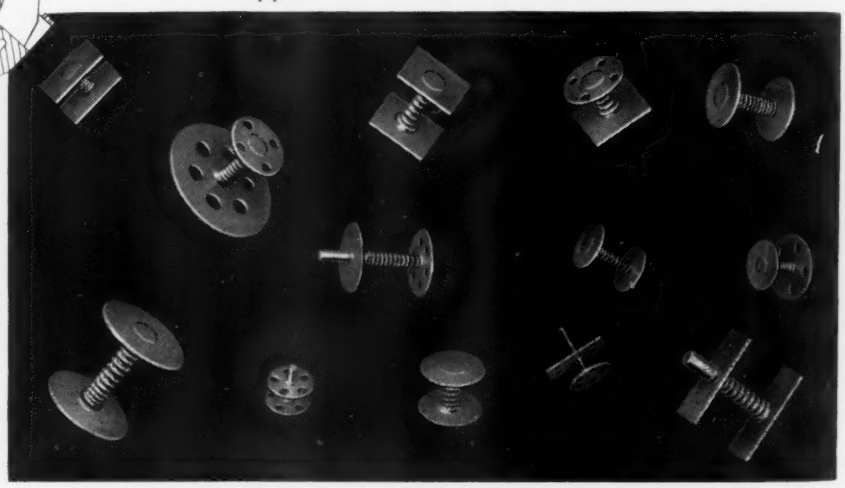
It's The Unusual Features of *Milwaukee* CHAPLETS

that insure Leak-Proof fusing and proper core support



Cross Section of a standard "V" engine — a typical casting where proper "burning in" is imperative. Milwaukee Thread Stem Motor chaplets ARE doing an outstanding job on this kind of casting.

It's the sharply cut "thread stem" design that insures leak proof fusing. Metal melts at the edges first, that's why the sharp edges "burn in" quickly and completely to insure instant fusing which results in freedom from leakers. Here is a design where fusion takes place at exactly the right speed to give you both instant fusion plus proper core support.



MILWAUKEE THREAD STEM MOTOR CHAPLETS

When light castings are subject to gas, steam, water, and other pressures, Milwaukee Thread Stem Motor Chaplets are specially recommended because they cut scrap losses due to leakers. Perforated heads allow trapped gases to escape . . . the lighter mass eliminates chill and because metal melts from edges, you have more edges resulting in a better opportunity for melting and complete fusing.

Add to this, uniform high quality, sturdiness of construction, an excellent protective coating and manufacturing to precision tolerances, and you soon discover why Milwaukee Chaplets are the favorite of the industry.

Motor Chaplets are available in round or square double heads from ⅜ " to 1" with the famous "thread" stem from 1/16" to ¼" in diameter.

If you have an unusual product or production problem where a specially designed chaplet or chill is required, we invite your engineering staff to consult with ours for the proper solution to your problem. **Milwaukee Chaplet & Mfg. Co., 1023 South 40th St., Milwaukee 15, Wis.**

MILWAUKEE CHAPLET

"I'll get to BUFFALO ANY WAY

...to get those BETTER BUFFALO PATTERNS"

If they walk or ride or swim,
For miles around smart foundry men
Can now be heard to plainly say,
"I'll get to Buffalo ANY way."

Here they know each job at hand,
Is Engineered and carefully planned,
And Craftsmanship that's "ultra plus,"
Produces patterns beauteous.

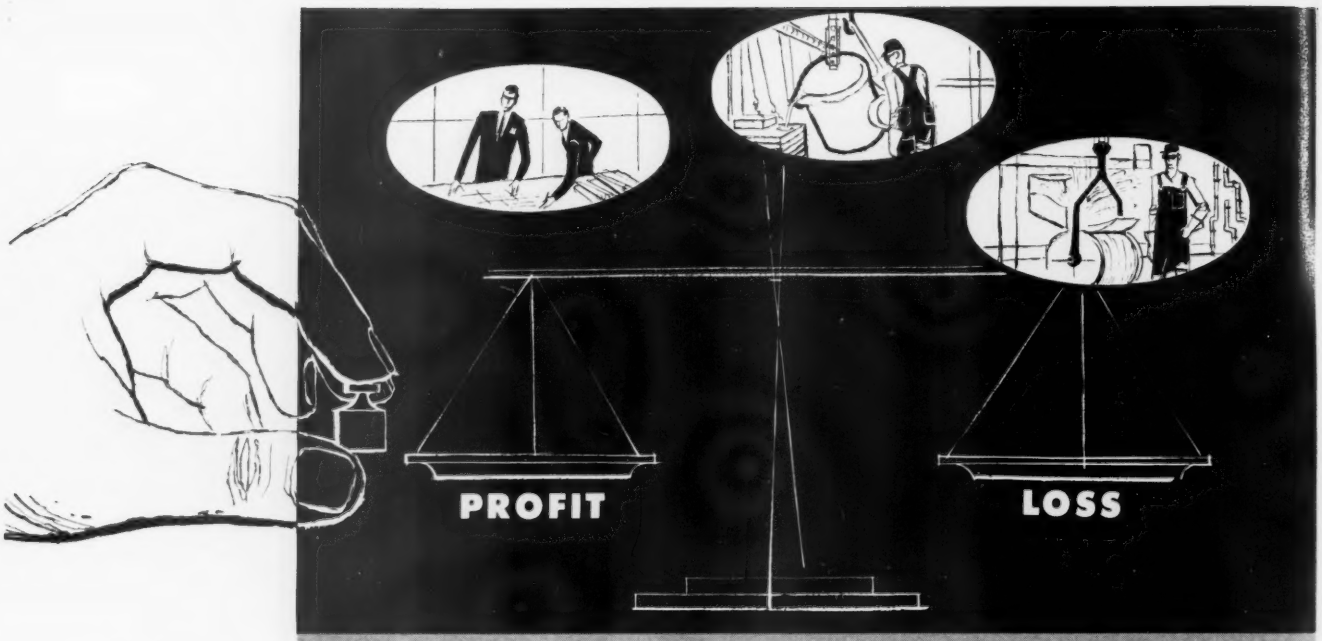
Our patterns, like a tailored coat,
Will FIT your foundry, kindly note,
No extra rigging you can bet,
Without adapting you're all set.

Production schedules really zoom,
And to truly dissipate your gloom,
Scrap ratios hit an all time low,
With these *better* patterns from Buffalo.

Production and Experimental Pattern Equipment • Shell Mold Pattern Equipment and Engineering • Wood and Plastic Models • Jigs, Templates and Target Fixtures • Permanent Molds • Forging and Stamping Dies • Dies for Injection and Reinforced Plastics Molding • Special Precision Parts • Special Machinery and Tooling • Metallizing • Engineering Drawing Service

Be our guest Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

BUFFALO PATTERN WORKS, INC.
832 HERTEL AVE., BUFFALO 16, N. Y.
DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY



Knight services include:

Foundry Engineering

Management

Organization

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Wage Incentives

Cost Control

Production Control

Modernization

Mechanization

Materials Handling

Automation

Survey of Facilities

Architectural Engineering

Construction Management

Your OPERATING EFFICIENCY WILL control your PROFITS in 1954

In foundry operation, making the best use of facilities and manpower determines the balance between profit and loss.

In many foundries, management and operation audits by experienced Knight engineers have helped to swing the balance to profit—through low-cost, readily effected improvements.

A recent Knight audit for a Michigan foundry resulted in substantial production increases and reduced costs. Improvements included the installation of a conveyor which eliminated handling . . . a rearrangement which increased capacity without additional floor space . . . and automatic timing devices which brought accurate process control and increased production.

These simple low-cost changes, accomplished without interruption to production, are part of a coordinated plan which is designed for future expansion requirements.

If you are interested in an audit of your operations to establish a program of improvement, take advantage of Knight experience and call or write our Chicago or New York office for prompt attention, without obligation.

EVIDENCE OF EXPERIENCE

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this is NEWS !!

AIR POWERED ANGLE GRINDER *without Gears*

Another Ingersoll-Rand First . . . a Direct Drive Angle Grinder

Size 2FA Angle Grinder

Features

- **This advanced grinder design eliminates the need of bevel gears, or gears of any kind.**
- **Two types of dead handles are available - one is straight, the other is 30° off of straight. These handles may be attached to either side of the grinder. The angle dead handle can be rotated to any one of four positions. This means that the tool can easily be adapted for corner grinding or for right or left handed operators.**
- **Built-in lubricator provides ample lubrication for long life.**
- **The motor is muffled to reduce noise.**
- **The exhaust deflector, located on the bottom of the tool, is adjustable to deflect the exhaust away from the operator.**
- **Quick-acting throttle makes this powerful grinder easy to use.**
- **Heavy-duty ball bearing construction throughout.**

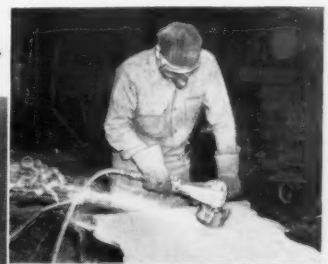
Specifications

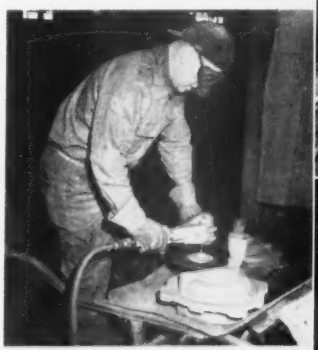
Speed, at 90 lb. air pressure	*6000 rpm
Length overall	15¼"
Height of angle head, less wheel	7⅛"
Weight, less guard	10 lbs.
Arbor diameter	⅝" - 11 thd.
Flared cup grinding wheel diameter	5"
Sanding pad diameter	7"
Size hose	½"
Hose connection pipe tap	½"

*Size 2FA-80 Angle Grinder, operating at 8000 rpm, is also available for special applications.

Here's an Angle Grinder that has the inherent qualities of any angle grinder, but features direct drive with no gearing! Its extra power and ease of handling provide fast, efficient and safe operation on practically all surface grinding, cut-off and sanding jobs.

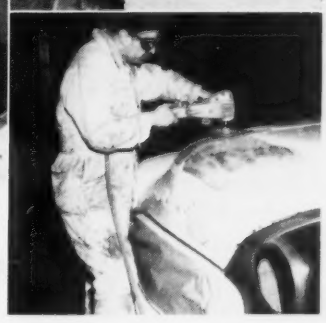
Grinding a casting with the 2FA-60 Angle Grinder. ▶





▲ 2FA-60 Angle Grinder with cut-off wheel nicking risers.

Sanding car hood with 2FA-60 Angle Grinder. ▶



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Four Detroit ROCKING Electric Furnaces melt brass with speed and economy at Sterling Faucet Company

To keep pace with increased production schedules in the post-war boom, Sterling Faucet Company installed four 500-lb. Detroit Electric Furnaces in their Morgantown, West Virginia plant. These versatile furnaces provide fast, controlled-quality melting in the production of brass plumbing goods and fixtures. And they operate at better than average economy over flexible production runs.

Detroit furnaces use indirect arc heat for fast, efficient melting. This permits a wide temperature range for melting both ferrous and nonferrous metals. Electrodes always remain clear of the bath, minimizing carbon pickup and alloy variation.

The constant rocking action of the shell washes metal over more of the refractory surface for greater heat utilization. This also promotes longer lining life and insures a homogeneous mixture when alloying metals. With precise power regulation and automatic control, the most efficient melting cycle can be duplicated, for more uniform results at lower cost.

Other Detroit features include automatic electrode control, easy shell interchange, choice of conical or cylindrical shells, longer trouble-free service.

Furnace capacities from 10 to 4000 pounds.

Investigate the advantages of operating Detroit Electric furnaces—for long and short production runs—in your plant. Write today for complete information.

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Kuhlman Electric Company

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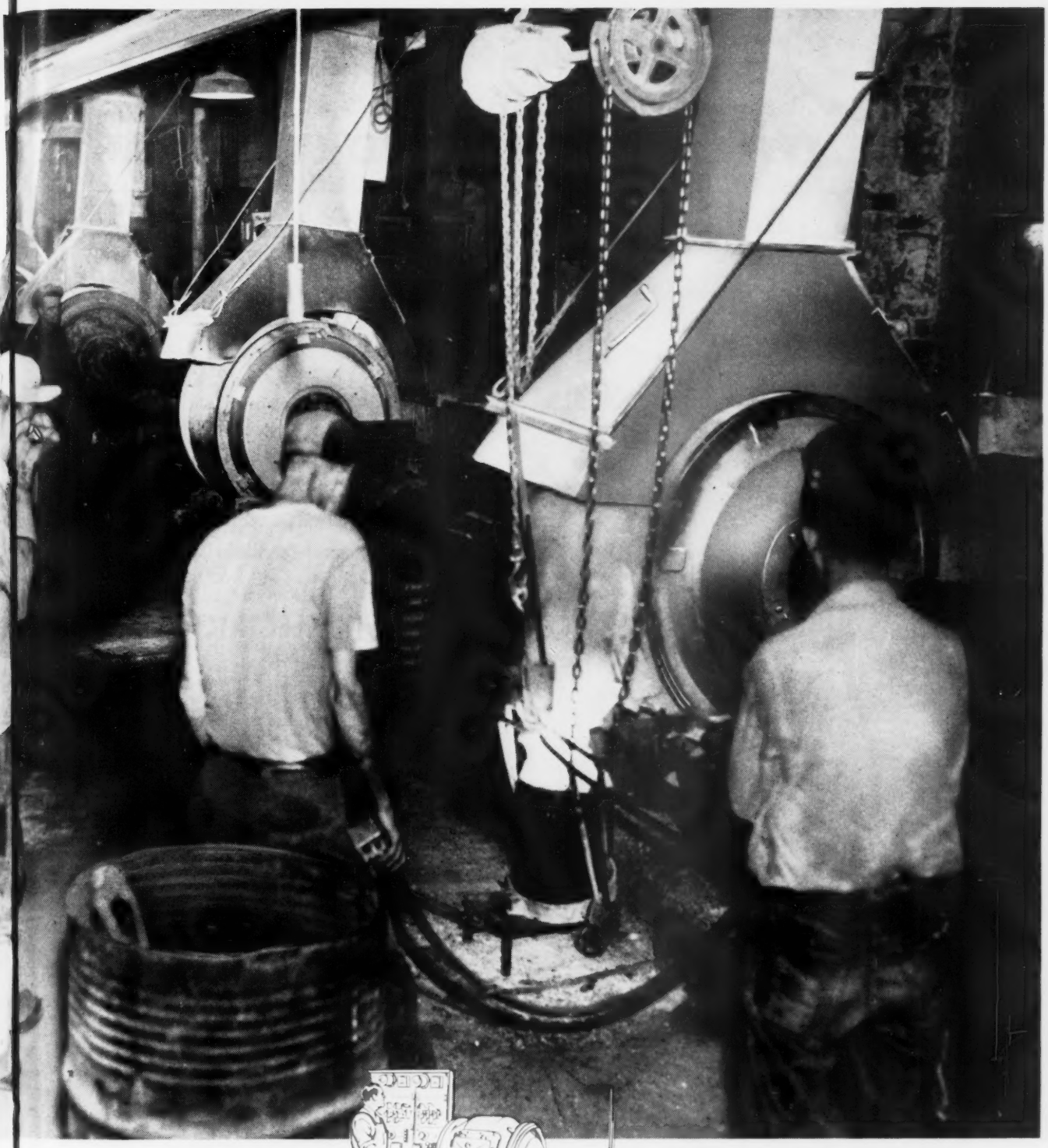
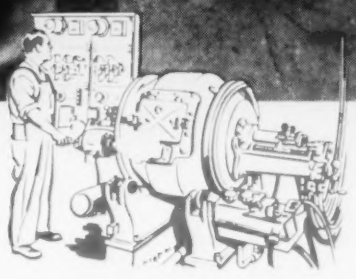


aster heats, better metal



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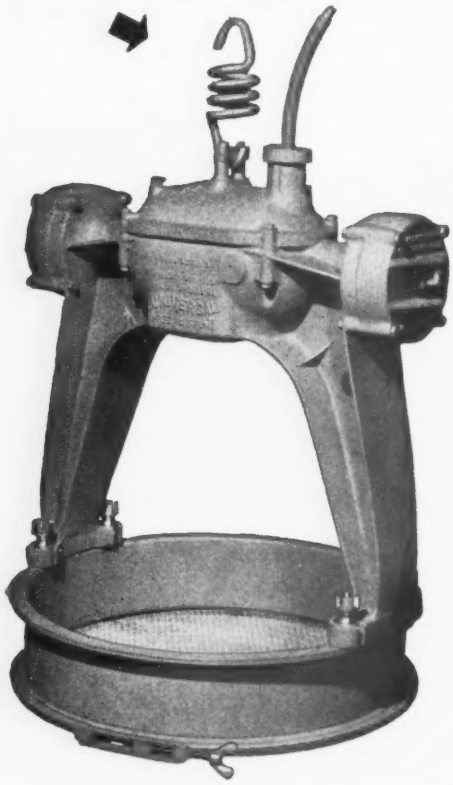
with the Double Eight Vibration

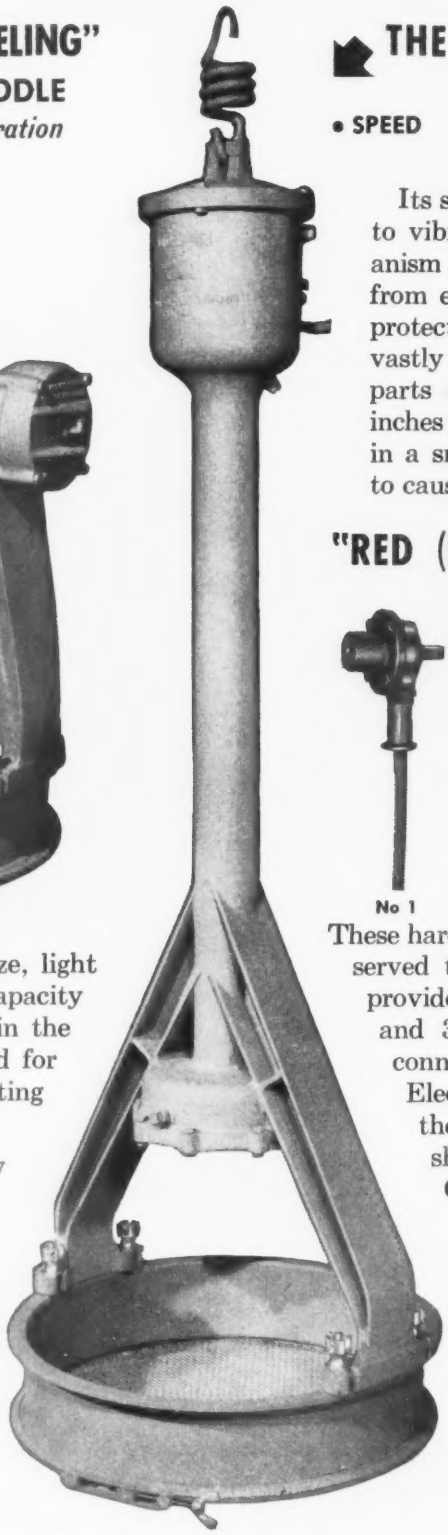


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



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WILL GIVE YOU

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- **LONGER LIFE**
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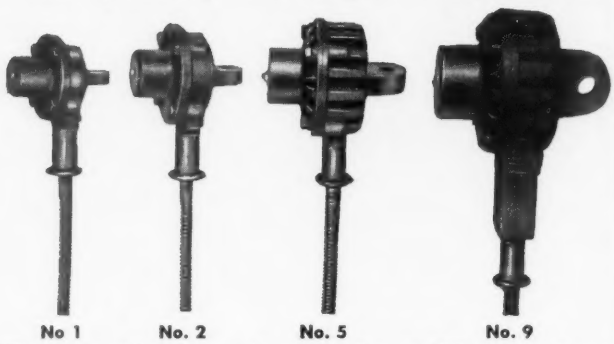
Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

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- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
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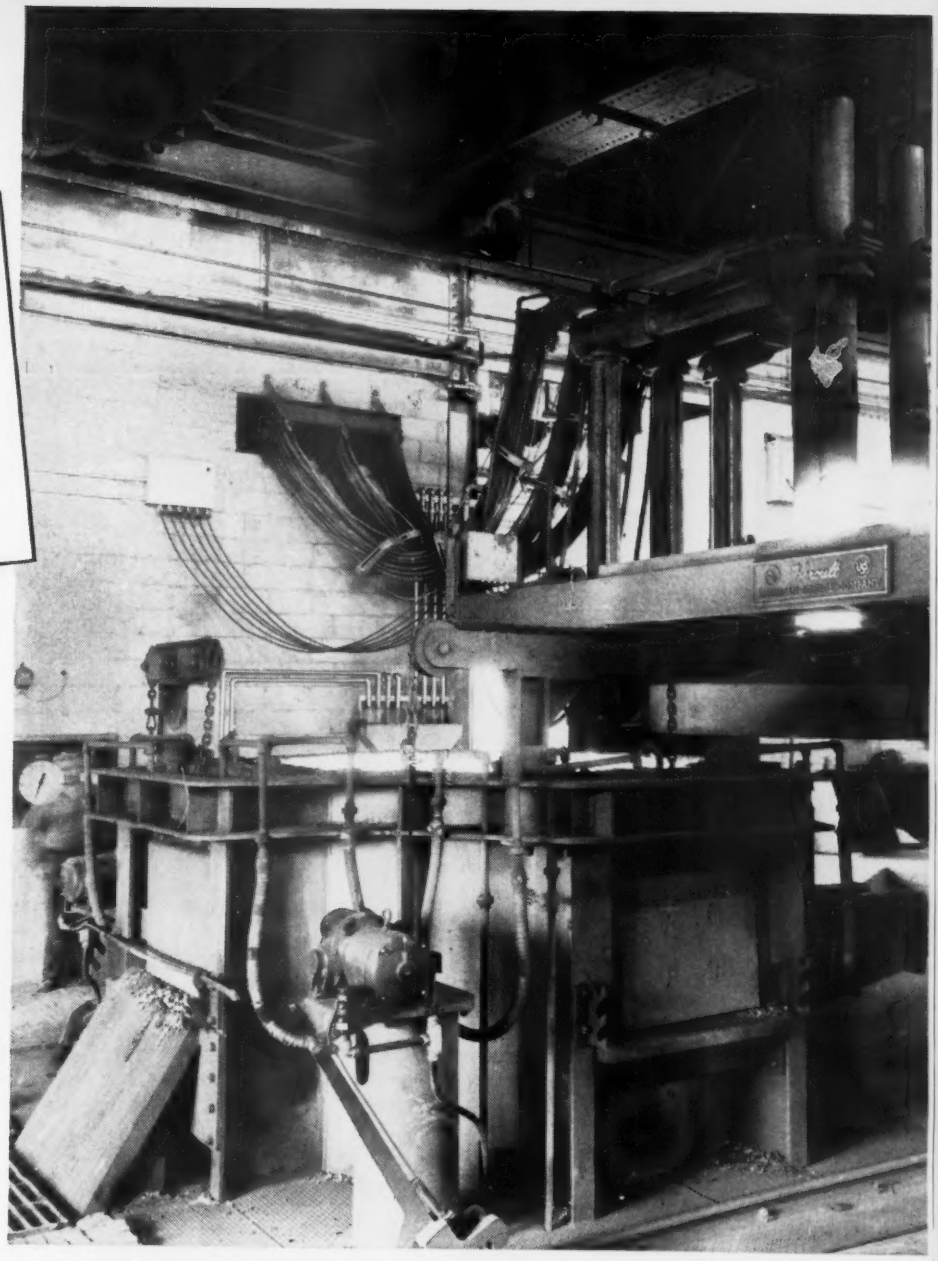
Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**

Heroult
ELECTRIC MELTING FURNACES



The high production capacity of the Heroult makes it the foundryman's favorite furnace!

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AVAILABLE in foundry sizes with either Gantry or swing-type roof, these widely used furnaces are equipped with the latest time- and labor-saving mechanical devices and electrical controls. They are noted for their efficient performance, low operating and maintenance costs.

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Our construction finds a parallel in the principle of mounting railroad cars on wheels. No doubt you've marveled at the smooth riding comfort of the streamliners time and again. Although, "comfort" isn't a consideration in moving molds out of your production area—**a smooth ride is essential.** This, we can **guarantee!** You buy "no vibration" insurance when you decide in favor of our sturdy conveyor track and rigid aluminum bottom boards.

Our highly skilled engineers design NOMAD CONVEYOR SYSTEMS to meet each foundry's specific needs.

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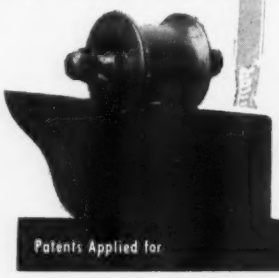

Write for
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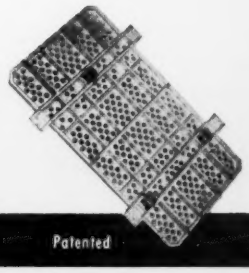

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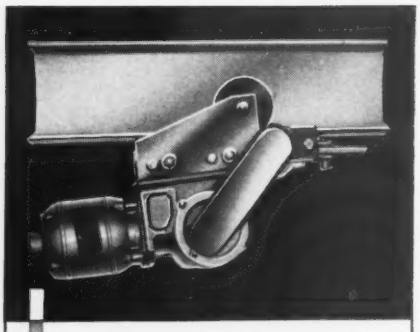

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TRACTOR
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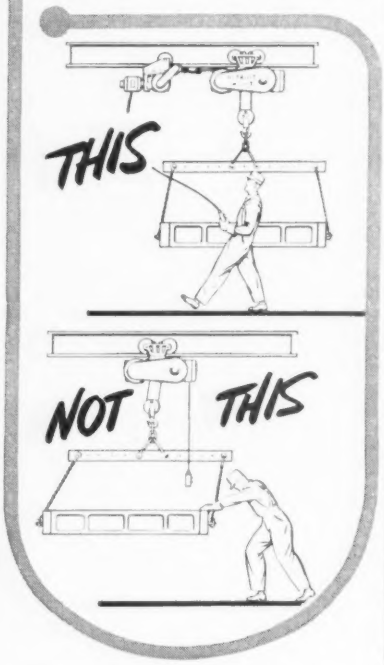

Attached by a simple draw-bar, the Trojan Tractor quickly converts existing, slow, hand-pushed hoists and light overhead cranes into fast, power-traveled units. Save time, effort; reduce material handling costs.

• *Ask for Trojan Tractor Bulletin 810 today.*

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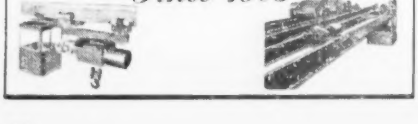
Since 1905



Readers' Comment

Report of Fire in Error

TO THE EDITORS:

We are greatly upset to find in the February issue of FOUNDRY a notice that the Seaboard Foundry Inc. was destroyed by fire.

A small foundry, about one mile from us, burned completely. The Associated Press reported it was our foundry and this report was spread. However, local papers and radio printed and radiocd that it was not Seaboard Foundry and tried to correct the error.

The writer has been in the foundry business for many years and has taken FOUNDRY for 40 years or more, and it is inconceivable that a magazine of your reputation could make such a mistake. Evidently you do not check the sources in matters of this kind. We are complaining because the matter can be vital and costly to a concern such as ours. We have had telephone calls from as far west as Chicago, and insurance adjusters have been here as a result of these reports.

Seaboard is a large jobbing foundry, half owned by the Whitin Machine Works of Whitinsville, Mass., and local interests. It would cost between a half-million and one million dollars to rebuild it.

CHARLES A. SLEICHER
President

Seaboard Foundry Inc.
Providence 7, R. I.

Editor's Note: FOUNDRY regrets exceedingly that the source of our information was in error, and that this incorrect report on the Seaboard Foundry Inc. was presented on page 162 of the February, 1954 issue.

* * *

Likes January Cover

TO THE EDITORS:

I think that the cover of the January issue of FOUNDRY is unusually good and certainly attracts one's attention.

THOMAS T. LLOYD
Vice President

Albion Malleable Iron Co.
Albion, Mich.

* * *

A Boost for Safety

TO THE EDITORS:

Once again we of the Shop Operations Committee of the Malleable Founders Society in particular, and the entire malleable industry in general, are indebted to you for the fine publicity accorded us in publishing the papers of the winners of our Safety Essay Contest.

I think it is particularly fine that you have done this, since plant safety work is one of those most necessary things which is not always given the attention it deserves and needs.

WILLIAM J. MACNEILL
Vice President

Badger Malleable & Mfg. Co.
South Milwaukee, Wis.

●

TO THE EDITORS:

Thank you very much for the fine treatment accorded our Safety Letter Writing winners. We felt that an activity of this kind might generate some further interest in safety and it should certainly generate still more interest as a result of the publicity given to the project.

We thank you for your continued fine support of all things worth while in the foundry industry.

LOWELL D. RYAN
Managing director

Malleable Founders' Society
Cleveland 14

* * *

Army Engineers Foundry

TO THE EDITORS:

We received the December issue of FOUNDRY magazine and were well pleased with the article on the 529th Engineers foundry. I am thanking you on behalf of the personnel of the 529th.

CAPT. HORACE E. MCCLURE
Commanding

Headquarters
529th Engineer Company (SVC)
Fort Belvoir, Va.

* * *

Index for 1954 Available

TO THE EDITORS:

Again accept my thanks for the much, much improved FOUNDRY. There is so much of interest to read, one never tires. Would appreciate a copy of "Index, FOUNDRY, Volume 81."

I have copies of FOUNDRY of past 20 years, all filed for ready reference. You can see how valuable the index is to me.

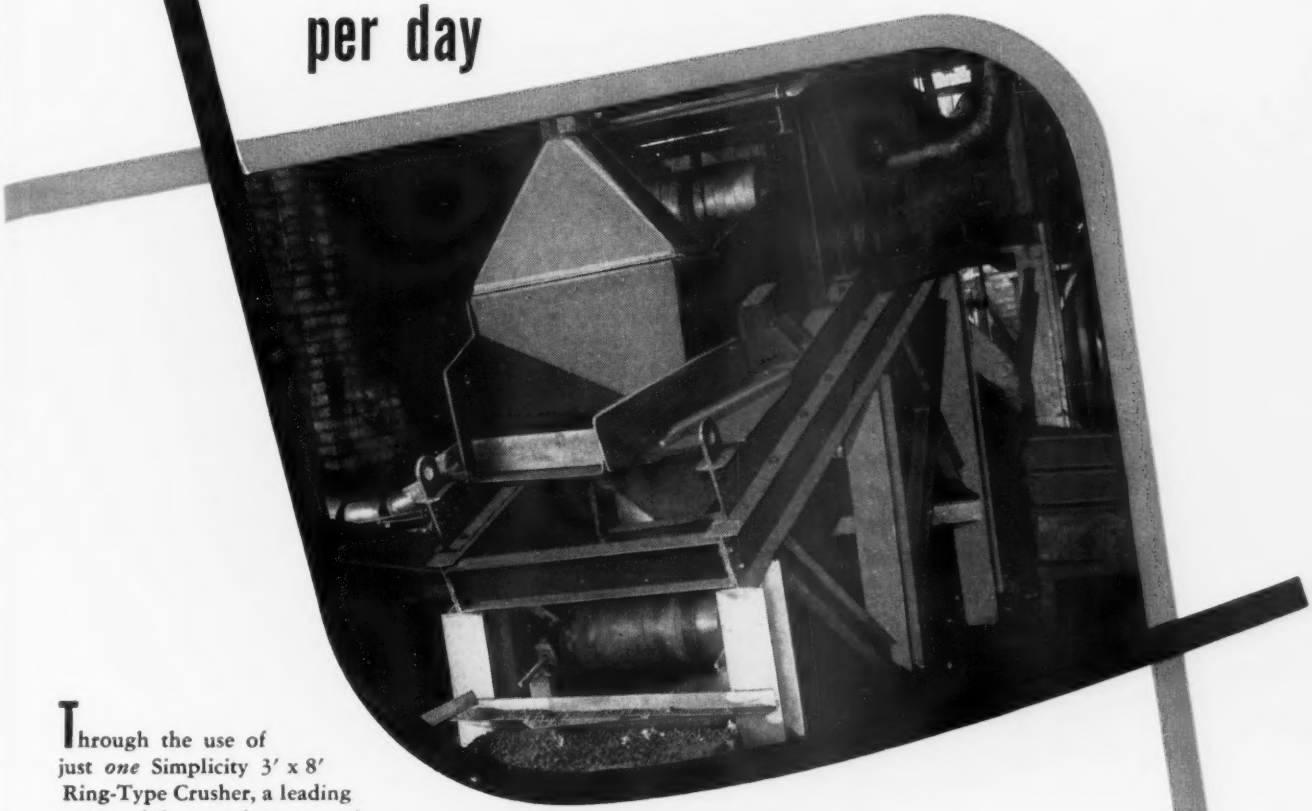
Again thanks.

BEN J. REJON

354 *Kendalia*
San Antonio 4, Tex.

Editor's Note: Copies of the FOUNDRY index listing all editorial matter published in 1953 are available without charge from FOUNDRY, Penton Bldg., Cleveland 13.

simplicity 3′ x 8′ ring-type crusher recovers about 400 tons of sand per day



Through the use of just *one* Simplicity 3′ x 8′ Ring-Type Crusher, a leading automobile manufacturer realizes savings of about 400 tons of sand daily in grey-iron foundry operations. In this installation, lumps of sand, especially those from cores that do not break up in shakeouts or screening, are fed to the Simplicity Crushing Screen instead of being hauled to the dump, as is the practice in many foundries. The recovered sand is returned by conveyor to sand storage and mulling equipment thus making appreciable savings in new sand requirements as well as eliminating the cost of hauling away sand lumps. With a Simplicity, one unit does both crushing and screening. It gives positive crushing action and maximum production of grain-size sand. Simplicity Crushers are available with either one, two, or three sets of rings, depending on the lump size to be crushed.

Simplicity Crushing Screens are in profitable operation today in foundries producing magnesium, aluminum, steel, malleable iron, and grey iron castings . . . why not put one to work in your foundry?

A Simplicity sales engineer will be glad to give you the full story. Write us.

103

Sales representatives in all parts of the U. S. A.

FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario

FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

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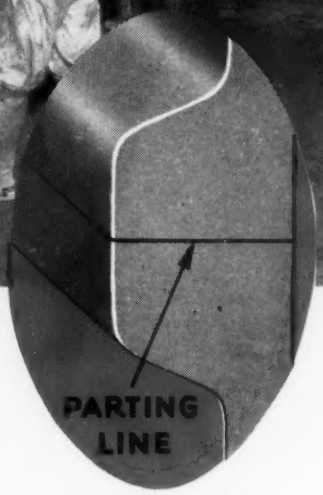
STERLING FLASKS last longer . . . much longer!

• **Rugged,** long-lasting money-savers . . . yes! . . . but you'll find other reasons for wanting Sterling Foundry Flasks. **Tensile Strength of 70,000 p.s.i.,** for instance, is engineered into these rolled steel channel flasks, further fortified by heavy, square-cornered steel flanges. **Rigidity** is assured by full-width bearing and solid reinforcing-bar around each section. The tremendous **pressure-resistance** thus built in, is an unequalled safeguard against casting-failures, year after year. All steel . . . **all-welded** . . . each section becomes one solid, rigid unit. The partings are **precision-machined** (planed to .005") and the flanges have plenty of steel for several refinishings if needed. The solid center rib helps to combine **super strength** and rigidity with **light weight** that you'll appreciate . . . just as more than 13,000 other foundries do, all over the world. You'll like the way Sterling Foundry Flasks **defy rough usage.**



This exclusive Sterling feature prolongs flask-life: Partings are precision-planed to .005".

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FOR NEARLY HALF A CENTURY *manufacturers of* FOUNDRY EQUIPMENT

Keep Them Running

One of the most important avenues leading to savings in the cost of castings production lies in the field of preventive maintenance. By keeping machinery and equipment in good operating condition at all times, the downtime on a machine or production line may be reduced materially, and the cost of labor required for the production of a ton of castings also may be reduced. Experts estimate that at least 50 per cent of the difficulties encountered in mechanized operation can be eliminated by a proper program of preventive maintenance.

The problem of preventing breakdowns begins with the purchase of equipment. Foundrymen should buy machines and equipment of sufficient capacity to meet the maximum requirements of the job. Sturdiness of design and the incorporation of such features as sealed bearings should be specified. Unless equipment is of satisfactory design and adequate construction, breakdowns and trouble can be expected. At times, buyers seem more concerned with price than with assurance that the equipment is adequate for anticipated requirements.

Organization of a maintenance department is most important. One or more individuals, depending on the size of the operation, must be charged with preventing downtime by keeping the equipment in good operating condition at all times. The personnel of this department must have detailed knowledge of the construction of all equipment in use in the plant, and must have the mechanic's ability for rebuilding, repairing, and maintaining the plant facilities. Rapid increase in the use of electrical and hydraulic controls has created new problems. Exceptional skills are needed to handle this job adequately.

Management also must conduct a campaign to educate all foundry personnel on the care of good equipment. Foremen and workers alike must see that equipment is kept clean, that it is not used unless properly lubricated, and that any indication of trouble is given prompt attention. Selling employees on the proper care of equipment can pay big dividends.

The foundry operator has two choices. He can give the equipment scant attention, complain about the conditions under which it must operate, and pay the penalty of added costs when it disrupts production with breakdowns, or wears out prematurely.

Or he can see that the equipment is given excellent care by the operating personnel, is protected from abuse and is kept in operation by a well organized and able maintenance crew, with the result that long and economical service is secured and production costs are reduced.

Are you keeping your plant in shape?

Frank G. Steinebach

Editor

Rollover section, showing line of rollover molding machines for medium size castings

MAGNESIUM SAND

Produces Varied Castings

ONLY the sand is inhibited at Hills-McCanna Co., magnesium foundry in Chicago. Marsh King, general superintendent, reports that, as a result of a recent expansion and modernization program, the foundry can produce successfully just about any casting for which magnesium alloys offer the necessary properties. And radiographs, showing some mighty sound castings made by the company, bear him out.

A host of varied castings for the defense effort and for numerous industrial and consumer applications are produced. These range from components for aircraft engines, guided missiles and radar, to baseball masks and portable tool housings.

A direct-reading spectrometer, x-ray and fluorescent penetrant equipment and complex qualifying fixtures are but a few of the tools used to maintain close controls over manufacturing methods from the first sample to the completion of the production order. Gating systems are developed in the company experimental foundry and are released for production only when the samples have been approved both metallurgically and dimensionally. The approved gating samples then are submitted to the pattern department where the rigging is reproduced in the production pattern equipment.

The foundry is divided into two sections—a rollover floor and a squeezer floor—each with its own sand handling system and melting department. One side of the rollover foundry floor is equipped with a line of rollover molding machines and strippers of 750 and 1500 lb capacity. Sand is supplied from a muller to overhead hoppers by belt conveyor. Molds made from these machines are set on gravity roller con-

FOUNDRY

By ROBERT H. HERRMANN
Associate Editor

veyors where they are poured, cooled and then rolled to a vibrating shakeout unit. Used molding sand is returned automatically to a storage hopper over a muller. Before each subsequent use, the sand is mulled with addition of inhibitors, binders and water as required. Castings are transported to a core knockout station where various methods are used for core removal. Many of the large cores are removed with pneumatic tools.

On the other side of the rollover foundry is a flexible conveyorized slinger loop used in conjunction with an 8800-lb rollover draw machine. The unit uses roller-topped shuttle cars traveling on rails in the floor to connect the various conveyors serving the slinger and rollover sections of the loop. A major advantage of the unit is that it can maintain high productive efficiency on patterns up to 6 ft square without downtime for introduction of new patterns into the system. Several different jobs can be run simultaneously without loss of efficiency, and two and three part molds are handled in the same fashion.

Each flask section is placed over the corresponding pattern and transported on the conveyor to the slinger station where the mold is rammed. The mold section and the pattern are then moved along a conveyor to the rollover-draw machine where the pattern is drawn and returned by shuttle car to a conveyor feeding back to the slinger station.

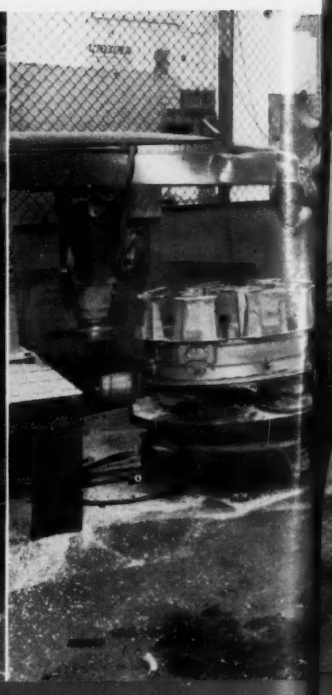
As each mold section leaves the rollover draw machine, it is cleaned and inspected; then, as the mold is assembled, it is checked by the foreman against a check list with as many as 30 individual factors under control. Many of the cores required for castings produced with this equipment are made up of complex assemblies, which must be checked carefully with fixtures as the cores are set. Before closing the mold, a strainer, consisting of a perforated tube of tin-plated steel filled with steel wool, is placed in the sprue well. After a final check, the mold is closed and the melting department is advised by telephone that it is ready for pouring.

Molten metal is brought to the pouring area by a bridge crane from which the molds are poured directly. After the molds are poured, the riser and sprue tops are sprinkled with a proprietary compound consisting of a mixture of sulphur, boric acid and potassium fluoborate to prevent ignition.

After the mold has cooled, it is hoisted onto a vibrating shakeout unit located adjacent to the pouring area. Used molding sand is automatically screened and returned to a storage hopper and muller by an independent system designed specifically for the slinger unit.

The sand used in both systems in the rollover foundry is 70 AFS washed silica blended with 3 to 5 per cent western bentonite at 2½ to 3½ per cent moisture. Approximately 1 per cent of sulphur-boric

This 8800-lb capacity rollover machine shown in the draw position is used in conjunction with a conveyorized sandslinger loop designed to maintain high productive efficiency on patterns up to 6 ft square



Right, one of the vibrating shakeouts in the rollover foundry

Below, view of core department with the large rollover unit shown in foreground

acid inhibitor is added to prevent any reaction with the molten magnesium. Batches are mulled for 3 minutes and each batch is checked for green compression strength and moisture.

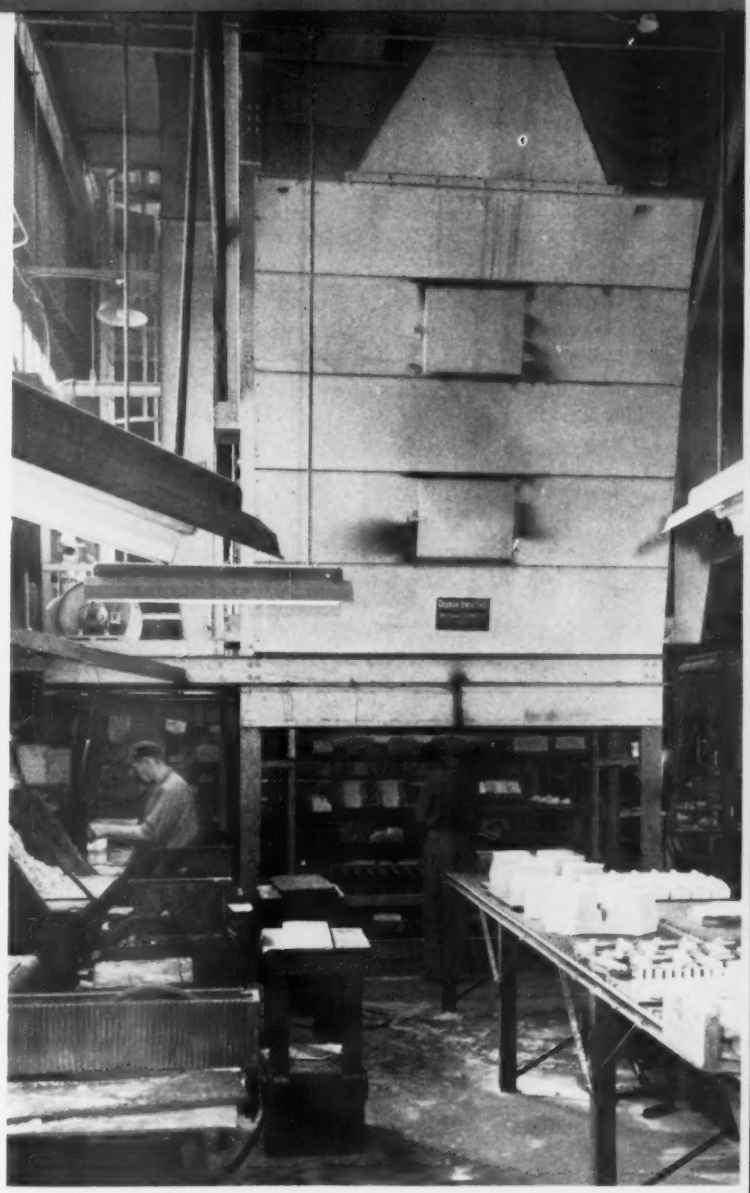
The melting department for the rollover foundry includes several 1-ton hydraulic nose-tilt batch furnaces and a battery of superheat furnaces ranging in capacity from 200 to 650 lb. The pots for all of these furnaces are fabricated from nickel-free steel.

Furnace charges consist of ingot and return-scrap of known composition. Each charge is melted down in a batch furnace and brought to a temperature of 1300° F. A spectrographic disk is poured into a metal mold from each batch and a sample is rushed to the laboratory where a direct-reading spectrometer gives a full chemical analysis within two minutes of receipt of the sample. Results of the analysis are reported back to the melting department by telephone and

Above, horizontal power rotary saws are used to remove gates and risers from the large-size castings

Above, right, gating metal is removed from smaller castings with band saws. Rotary filing operations are being performed on castings in the background

Right, this tower oven is used for baking small and medium-sized cores. Batch ovens bake the large cores



if the results indicate conformity with specification, the batch is released for the next step in the procedure. This step consists of transferring the batch of metal into the smaller furnaces where it is heated to 1400° F, degassed with chlorine bubbled through a carbon tube, and then superheated for grain refinement.

After the superheating operation, the individual pots are cooled to the desired pouring temperatures, which fall in the range of 1300° to 1650° F. The small furnace pots are transported directly to the pouring areas. Metal in all furnaces is kept covered at all times with flux to prevent reaction of the molten magnesium with the atmosphere. Test bars and spectrographic disks for qualifying test and analysis are poured from each batch of metal. The test bars, analytical samples and castings poured from the heat are identified with a heat number.

All melting operations are controlled by an operator situated in a mezzanine control room. Each of the batch and superheat furnaces is equipped with a thermocouple connected to one of a bank of recording potentiometers in the control room. The operator controls all temperatures by proper metering of fuel to the furnaces, using a bank of valves located in the control booth. He also operates the valves used to control the chlorine flow during the degassing process. The control operator directs personnel of the melting department through an audio communication system, and he is in contact with the molding floor and the laboratory by direct telephone lines.

Castings are solution heat treated in a 1 per cent sulphur dioxide atmosphere in these electric ovens. Temperatures are held to plus or minus 5 degrees

The squeezer floor of the foundry contains a battery of jolt-squeeze machines capable of accommodating flasks up to 16 x 20 in. The squeezer machines are arranged in line. Molds are set up on gravity roller conveyors and are poured off from pots carried by a bridge crane which services the entire area. The squeezer foundry has an independent sand system and melting department similar to those described above.

Cores for both foundry floors are made in a central core room equipped with various types and sizes of core blowing equipment of the latest design. Large cores are made on a 1500-lb rollover machine used in conjunction with multiple jolt tables. Cores are baked in a gas-fired tower oven for a 2-hr cycle, or in one of many batch ovens arranged along one side of the coreroom. Aluminum, magnesium and wooden coreboxes are used, depending upon the nature of the core and on the production requirements.

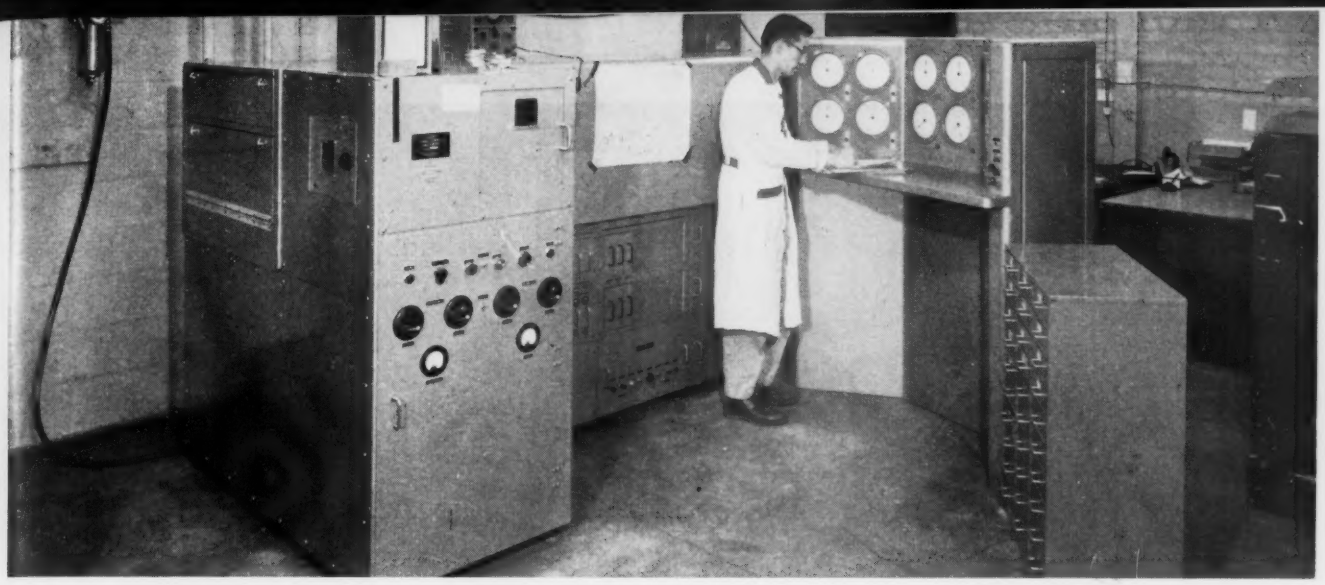
Cores are made of washed silica sand of 70 AFS fineness, to which is added cereal and resin binders and inhibitors consisting of a mixture of sulphur and boric acid and fluoborate or fluosilicate. Dyes are added to the sand to facilitate identification of cores produced on different shifts.

After removal from the baking oven, cores are inspected, definned and, where required, they are rubbed to exact dimensions by means of strike-off fixtures. Core subassemblies are pasted, fixtured and stored prior to delivery to the foundry floor.

A central cleaning room also serves both foundries. Castings are shot-blasted with the gates and risers on to insure clean return scrap. Gating systems are removed with band saws, radial circular saws or by means of a vertical lathe. Castings are held in fixtures during sawing by mechanical or air operated clamps.

Castings are ground with pneumatic rotary hand tools or on stand grinders, which are hooded and exhausted through water curtain dust collectors. Some castings, such as the baseball masks are water tumbled. All castings are given a final chromic acid pickle.

Many castings, particularly those for aircraft, are tested for dimensional accuracy in special fixtures



A test casting poured from each batch furnace heat is checked in this direct-reading spectrometer and the complete analysis is obtained within 2 minutes

Most of the aircraft castings are radiographed and otherwise checked for conformance to specifications

Some cast components, particularly those for jet aircraft, are checked for dimensional accuracy in qualifying fixtures. One such part must meet 137 qualifying points. Where specified by the customer, locating points are machined on the castings while they are held in the fixture through guide bushings integrally mounted in the fixture. These machined points are used by the engine manufacturer to mount the casting for subsequent machining operations with minimum alignment operations.

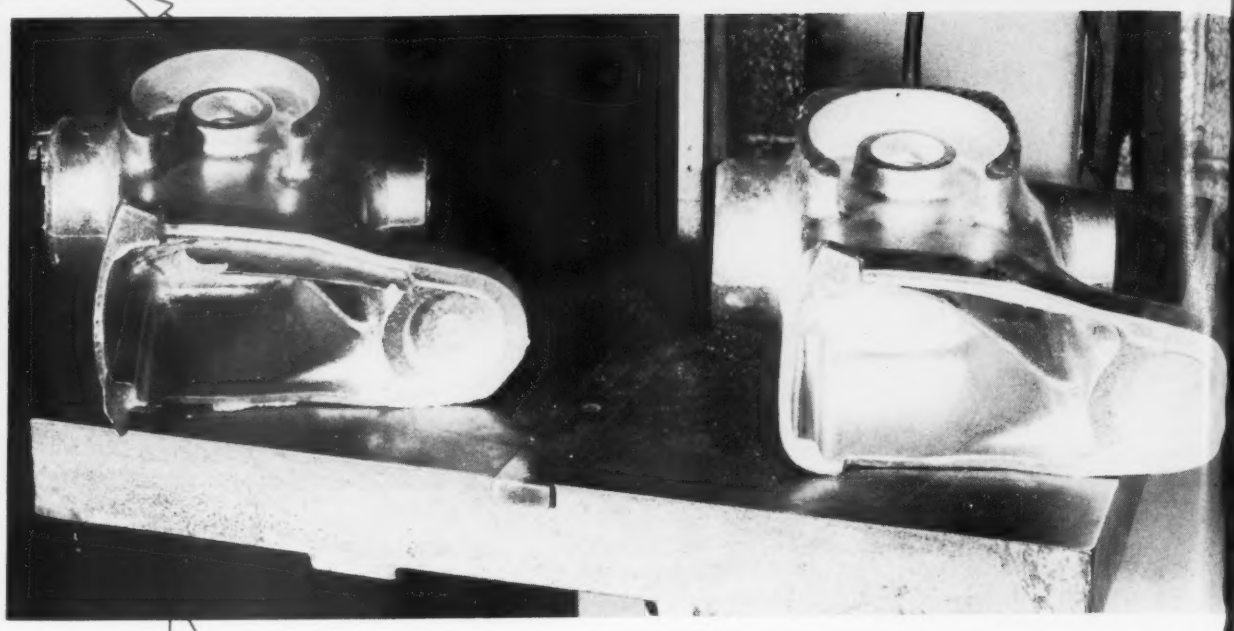
A large percentage of the aircraft components produced are radiographed and otherwise checked for defects or other departure from specification. Such tests include fluorescent penetrant inspection, tensile and hardness tests and grain size determinations as specified.

Most castings are solution heat treated in a 1 per cent sulphur dioxide atmosphere in electric recirculating ovens at 500° to 770° F for 14 to 24 hr, depending upon the alloy. Oven temperatures are held within ±5 degrees, and sulphur dioxide is introduced from pressurized tanks when the oven temperatures reach 650° F. The solution treatment is followed by an air quench and, in some cases, by an aging treatment at 325° to 350° F.

Majority of the castings produced at Hills-McCanna Co. are made of one of the following three alloys: AZ92A, AZ63A or AZ91A. The zirconium-rare earth alloys are also poured in increasing tonnages as the demand for these alloys grows through new applications in jet aircraft parts subjected to higher temperatures. Table I gives the average physical properties and the nominal compositions of the three common alloys.

TABLE I—Nominal Composition and Typical Physical Properties Obtained from Magnesium Alloy Test Bars

Alloy Designation	Condition	Nominal Composition Al	Zn	Mn	Mg	Tensile Strength psi	Yield Strength psi	Elongation Percent in 2"
AZ92A	As Cast	9.0	2.0	.10 Min	Remainder	24,000	14,000	2.0
	Heat Treated					40,000	14,000	10.0
	Heat Treated & Aged					40,000	23,000	2.0
AZ63A	As Cast	6.0	3.0	.15 Min	Remainder	29,000	14,000	6.0
	Heat Treated					40,000	14,000	12.0
	Heat Treated & Aged					40,000	19,000	5.0
AZ91A	As Cast	9.0	.6	.13 Min	Remainder	24,000	14,000	2.0
	Heat Treated					40,000	14,000	11.0
	Heat Treated & Aged					40,000	19,000	4.0



Cast aluminum work heads for hand operated machine are band filed. Part at left is unfinished, while the part at right is shown with flashing removed

By H. J. CHAMBERLAND
Field Engineer
The DoAll Co.
Des Plaines, Ill.

BAND FILING Helps Re

IN plants where the advantages of the band machining process are fully exploited, band or continuous filing is a natural step since it is the secondary function of the equipment. The two processes are, however, by no means inseparable because there are a great many band filing units in use where very little or no actual band machining is done.

Even in tool and die shops, band filing units are installed adjacent to the band machines to get the most from each piece of equipment with a minimum of downtime and operating cost. Because band machines used in foundries are of the high-speed or friction cutting type, band filing units are a must since the process requires relatively low speeds.

Band Filing Objectives—The band filing machine was developed with three particular objectives in mind: (1) To expedite filing operations as a whole. (2) To relieve conventional equipment economically of many light cuts that consume too much setup time in proportion to the amount of material to be removed. (3) To reduce the inventory of other types of files by reserving them for operations not within the scope of continuous filing. Generally speaking, all files are regarded as finishing tools, but a file band is in a class by itself since it often can remove material at a rate comparable to that of a milling cutter, a shaper tool or a broach. This point particularly applies to cast iron and especially to nonferrous and nonmetallic materials where production rather than finish is the prime requisite.

Filing costs as a whole can be reduced by the application of the proper method at the correct time. Primarily important is the fact that both jig and hand files are reciprocal movement tools. Jig files are always subject to more or less unnatural depreciation because, unlike an expert hand filer, the operator has no control over return strokes. Band filing never was intended to eliminate hand and jig files from the industrial picture. Each method has its respective advantage, and the three have been used in conjunction again and again to expedite many applications, ranging from a single part to substantial volume production.

Another important factor to remember when a filing problem develops is that band filing is nine times faster than hand filing and almost four times faster than jig filing. Band filing therefore always should be given first thought, regardless of number of pieces involved, if only to remove excess material. Results will depend, of course, on selecting the correct file for the job. The term "correct" in this instance applies to quality of file band as well as to shape, style of cut and number of teeth per inch.

A file band differs from other types of files in that it consists of file segments expertly mounted on a high-quality Swedish steel band. The precision required of such an assembly can be appreciated better when one realizes that all segments must function in unity. Any variation in height, sharpness and hardness of teeth obviously would impair cutting action and rapidly shorten tool life.

Types and Sizes—Like other files, file bands are made for roughing, for finishing or for a combination of both. File bands are available in flat, half-round and oval shapes, in $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$-in. widths. Two or even all three shapes or widths often are used to do a job simply and economically.

Foundries want a file band that will cut excep-

Mirror attachment permits operator to observe progress of filing action and to regulate work feed pressure for finish and rapid chip removal

Steel casting is band filed to meet specifications of a former milling machine setup. File band also can be employed as a preliminary roughing agent

ps Reduce Foundry Costs

tionally fast, retain its sharpness for a long period of time and yet produce a desirable finish. Although it is impossible to obtain all three characteristics simultaneously at peak performance, foundries might sacrifice finish in favor of the other two. Cutting superiority is available in the short angle file because of the design of its long knife-like teeth, which are practically nonclogging. This type of file will resist a maximum of work feeding pressure while generating a minimum amount of heat. This point is most significant since heat has the same effect on the teeth of a file band and the surface being filed as on any other cutting tool. On the other hand, accidental work pressure applied to a point where it stalls a properly selected band will seldom impair its cutting efficiency, providing the teeth are not already loaded. This difficulty could occur even with an extra-coarse-toothed bastard file.

The following production increases resulting from use of short angle files to replace bastard cut files should be of interest to foundrymen: 25 per cent faster on cast iron; 50 per cent faster on copper; 30 per cent faster on brass; 75 per cent faster on bronze; 40 per cent faster on aluminum.

The productivity and life span of a file band can be determined better by subjecting it to tests representing many times the severity of normal cutting action. As with all modern band tools, of which there are 19 distinct types, the short angle file was not released to industry until repeated laboratory tests proved that results under actual use would be satisfactory. One of these tests consisted of cutting through a 1-in. cast iron plate for 50 consecutive hours. At no time was there any evidence of chip loading, and at the conclusion of the test original cutting efficiency had depreciated less than 15 per cent.

File band width has considerable effect on cutting rate. A ½-in. file will remove approximately three times more material than a ⅛-in. file.

Operating Practice—The velocity range for band filing of ferrous alloys and castings is considerably lower than that for band sawing, never exceeding 125 fpm. Material thickness is not a factor during band filing, but using the wrong file or uneven work feeding pressure produces a "belly" cut on thicker sections. Furthermore, file bands are precision tools and should be cared for as such. When the files are not in use, tension should be released. Above all, the tools should be handled carefully and stored as removed from the machine to prevent possible damage from rust, nicks and other destructive factors likely to shorten unduly their intended useful life.

As a precautionary measure, it should be mentioned that although attempts are made occasionally to resharpen worn file bands, the abrasive process of tool reconditioning unfortunately cannot be applied successfully to this type of file. Files so salvaged have a tendency to pull the material sideways, to cut rough, to slow or to hang up in the kerf and roll off the carrier wheels. At least, these are the conclusions of expert technicians in this field, and they tend to prove that the original precision of file bands cannot be duplicated by "artificial" means. Any precision band tool, regardless of type, has paid for itself many times over when it starts cutting inefficiently, and deserves replacing rather than temporary rejuvenation.

An x-ray technician closes lead door to cabinet in which aircraft castings are radiographically tested

Magnaflux and Dy-Chek methods are used for examining many castings

Testing Aircraft Castings

DESPITE the spectacular results that have been attained in the use of ultrasonic testing equipment, most of the castings used by the American aircraft industry are now being accepted or rejected on the basis of radiographic and static test results.

Among the many reasons for this, the following are probably most important:

1. Ultrasonic equipment suitable for the testing of castings is still too new to be available to many aircraft manufacturers and their subcontracting foundrymen.

2. The more porous types of sand castings cannot be satisfactorily tested with any ultrasonic facilities.

3. Ultrasonics are not as suitable as x-rays for the identification of certain types of flaws.

4. Static testing remains the most economical method of ascertaining the abilities of individual castings to meet minimum quality standards.

In general, radiographic methods are used by aircraft manufacturers for batch-testing purposes—that is, to ascertain whether a relatively few castings in each batch have serious internal flaws. The procedure that is usually followed in this connection is indicated by a specification recently issued by Consolidated Vultee Aircraft Corp. which reads in part:

"A test lot of castings submitted for radiographic inspection shall consist of 10 to 100 castings of the first production lot of each Class A or AA design (that is, a design of structural importance to an airplane). If a first production lot consists of less than 10 castings, the next production lot or lots shall be added to the test lot until the latter comprises 10 castings.

"All castings of the original test lot shall be subjected to radiographic inspection. From the radiographs of the test lot, the worst casting or castings shall be selected by the x-ray laboratory for static testing to destruction. Such 'worst castings' must, however, be free of obviously rejectable defects. . . .

"The x-ray laboratory shall further grade all castings of the original test lot in the order of increasing merit, so that the engineering test laboratory can obtain alternate test castings in the event that the original selection fails to meet static test requirements."

Specimens from the first lot of test castings are destroyed by tensile, shear, or compressive loads (depending on their design purpose) because that is the only way to evaluate their quality relative to physical properties in the event that no severe defects are disclosed by x-rays.

If the initial test specimens fail to meet both radiographic and destructive test requirements, the initial production lot is rejected and an effort is made to correct the foundry procedures that led to the rejection. If the initial test specimens are proved to be satisfactory, inspection requirements may be relaxed to the point where only one of each 100 castings in subsequent production lots will be x-rayed and destructively tested.

However, if the castings are of critical structural importance to the performance of an airplane, all castings in all production lots may be subjected to

An x-ray film, showing details of aircraft castings is removed from a rinse tank at the AiResearch Mfg. Co.

AiResearch workers in Los Angeles study x-ray film of three aluminum alloy castings

By THOMAS A. DICKINSON

static loads which are nondestructive to those parts that meet minimum mechanical strength requirements.

Following such nondestructive tests, all or part of the castings may be Magnafluxed or Dy-Chek inspected to determine whether flaws of any significance were developed by the static loads.

Northrop, Douglas and other aircraft plants with appropriate facilities have a current tendency to utilize ultrasonic test methods to minimize the need for destructive tests—not as a substitute for radiographic testing techniques—because ultrasound cannot always identify the large flaws that are detected by x-rays, yet will detect the small (yet important) defects which have heretofore necessitated the use of destructive test methods.

Most foundrymen with experience in and outside of the aircraft industry now agree that the over-all test methods employed in the manufacture of airplanes are much too elaborate and expensive for the average foundry—whose products, at the very worst, could probably not cause a loss of life or limb. But simultaneously they agree that the aircraft industry has proved one very important point, namely:

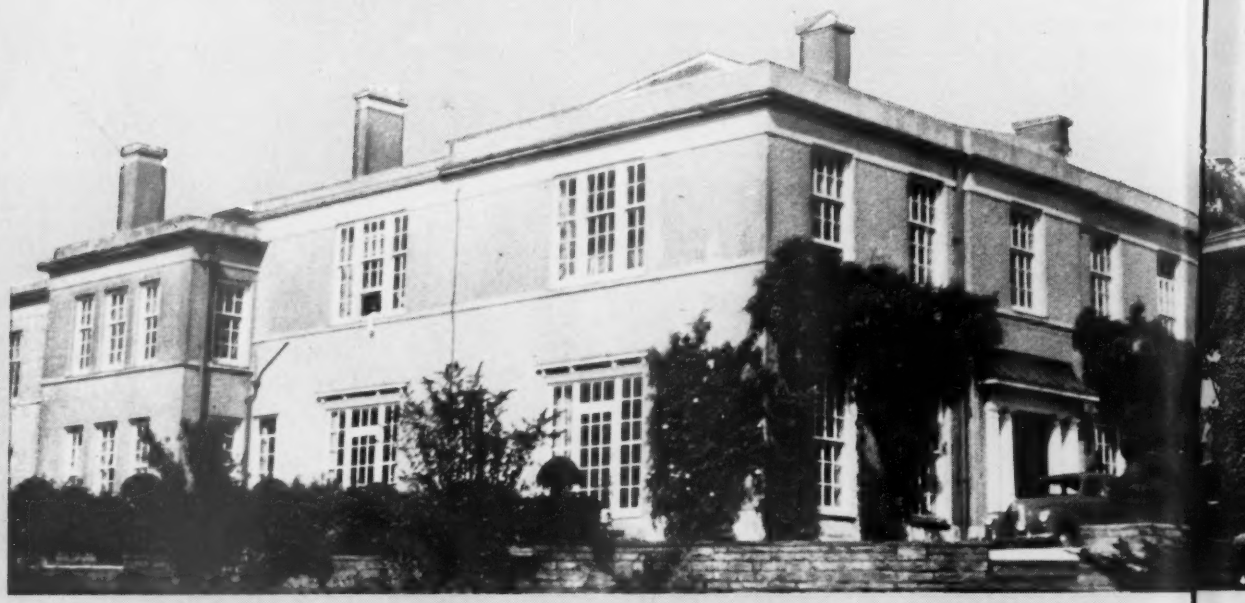
If an initial batch of castings is carefully tested and proved to be satisfactory, the chances are that defects in subsequent batches will be less than one in 100.

Thus, the extent to which aircraft test methods can be adopted for use by the average foundry may easily be determined by answering the question of:

How much are defective castings costing us, individually and collectively, in terms of dissatisfied customers and future orders that will not materialize?

FOUNDRY RESEARCH IN

Foundry research in England differs considerably from such activities as we know them in this country. The differences apply both to the organizational setup and to the types of work pursued. This discussion—provocative in some respects—is based on the author's recent visit to the leading English foundry research groups



View above shows the home of the British Cast Iron Research Association at Alvechurch near Birmingham

THE writer recently realized a fond ambition of visiting the principal foundry research centers in England as part of a tour of metallurgical groups. After a number of years of following British research literature it was indeed stimulating to meet many of the investigators and discuss the progress of foundry science. No less interesting to a visitor than the differences in the way of life in England from that in the U.S.A. are the differences in the organization of research activities.

In attempting to record some of the impressions obtained during these visitations the writer is keenly aware that in the brief period of visits (three weeks) much was missed or at least covered only in part. Nevertheless, in view of the limited information regarding the general program of foundry research in England which is available in this country, even a brief survey may be of possible interest.

While numerous British papers dealing with specific research investigations and production activities have appeared in our technical literature, there has been no description dealing with research organization and underlying attitudes towards research which is the subject of this writing. The British experience is of particular value to us at this time in view of our own increased interest in the application of science to foundry problems and the recognizable change in attitude towards research which was a prerequisite factor.

It is undoubtedly true that the common language has made the results of British foundry research known to American foundrymen. This is fortunate, for a great deal of useful data may be obtained by following the various British publications.

The first impression obtained in conversations with British technical groups is that the attitude towards research, as well as the organization of research, is distinctly different from that to which we are accustomed. The differences with respect to organization are relatively easy to describe in contrast to those of differences in attitude. To a certain extent the differences in organization evolve from differences in attitude; hence, let us consider the question of attitude first. The impressions with respect to attitudes are not specific to the foundry field; visits to metallurgical and welding groups resulted in similar and

IN ENGLAND

By WILLIAM S. PELLINI
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Washington

Temporary offices and laboratory of British Steel Castings Research Association, Sheffield

confirming impressions.

No Confusion Over Terms—The distinction between *development* and *research in fundamentals* is quite clear in England. There is no apparent confusion with terms such as the old standby we often hear of "practical research" (whatever that is) in contrast to "research," described without the benefit of an adjective inasmuch as "impractical" is to be understood. In the English mind it is quite clear that research studies are aimed at developing fundamentals and development studies are intended to translate fundamentals into practice. In order to make things cheaper, better and with more profit one is considered as important as the other. The development of a science is considered as practical as the development of new techniques and in many cases of more long lasting effect.

In the English view, much of what we publish as research is not research at all but operational development. There is a great deal of pride in achievements related to broadening the base on which science rests, but at the same time there is evident a feeling that their achievements are not translated to practice as quickly as would be the case in the U.S.A. All of this requires a bit of expansion and explanation in terms of actual cases.

Individuals, at both working and administrative levels, indicated a common feeling that there was too little effort expended in the U.S.A. on research as defined above. On the whole, this is representative of the general European view that the U.S.A. has capitalized on the research effort of others without returning proportionally to the fund of basic knowledge. The implications are that the attitude of our industrial circles is not as yet sufficiently farsighted to recognize the need of expanding research in proportion to expansions of development.

This is an issue which has received considerable debate on this side of the water and usually boils down to the question of "how much is enough." Some industries, such as the chemical, have solved the problem by the simple dictum that "there is no such thing as too much in fundamental research" and chemical technology has forged ahead by leaps and bounds. Perhaps the foundry industry should take note.

It is believed that most of those concerned would agree that English research has been most excellent and valuable to us. We would agree also that we are capable of doing more and should do more. In this respect it is recognized in other fields—physical metallurgy for example—that as the result of postwar conditions we cannot depend on the previous rate of flow of basic research information from Europe that we have in the past. A continued healthy growth of our industry depends greatly on expansion of the general fund of basic knowledge which means that we must do more. Our leaders in the foundry industry certainly recognize this fact, and economic factors which must serve as their guide will certainly dictate expansions in the direction of basic research.

Need More Than Technical Men—An argument may be made in another direction. The foundry industry is presently engaged in recruiting technically trained men—as through the Foundry Educational Foundation, for example. The value of technical men lies in the fact that their training provides for use of scientific information. Without this training it is impossible to use effectively our fund of scientific knowledge—it will lie sterile in our technical literature.

On the other hand, a small fund of scientific knowledge means that technical men cannot be used effectively, for the technical man is no more effective in using "art" than is a nontechnical man. The present infiltration of technical men in the foundry industry is only one outward sign of technological development; the other must be the infiltration of the basic research approach to foundry problems. In simple words, recruitment of technical men is not enough, the foundry industry must at the same time plan for a long range expansion of foundry science.

The use of scientific data demands association of cause and effect, judicious choice of scientific facts which apply to the problem, and above all "thinking through" to the solution. Scientific data solve no problems directly, they merely (*Please turn to page* 296)

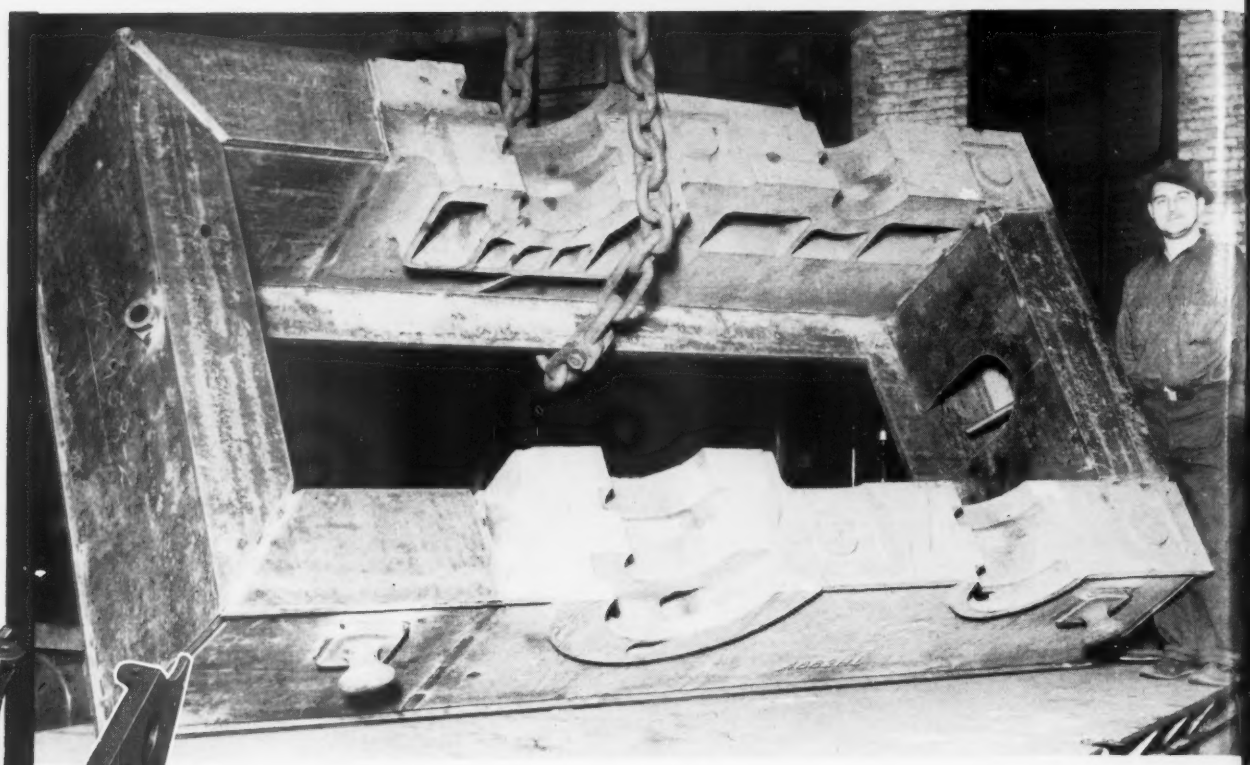


Fig. 1—Freight car center filler comprises three steel castings welded together

Fig. 2—Machine frame is a welded fabrication of steel castings and steel plate

CAST-WELD CONSTRUCTION

Cast-weld pieces often are better and cheaper than a one-piece casting or an assembly in which no cast parts are used. Such cast-weld fabrications now are universally accepted, and several are described here

By JOHN HOWE HALL

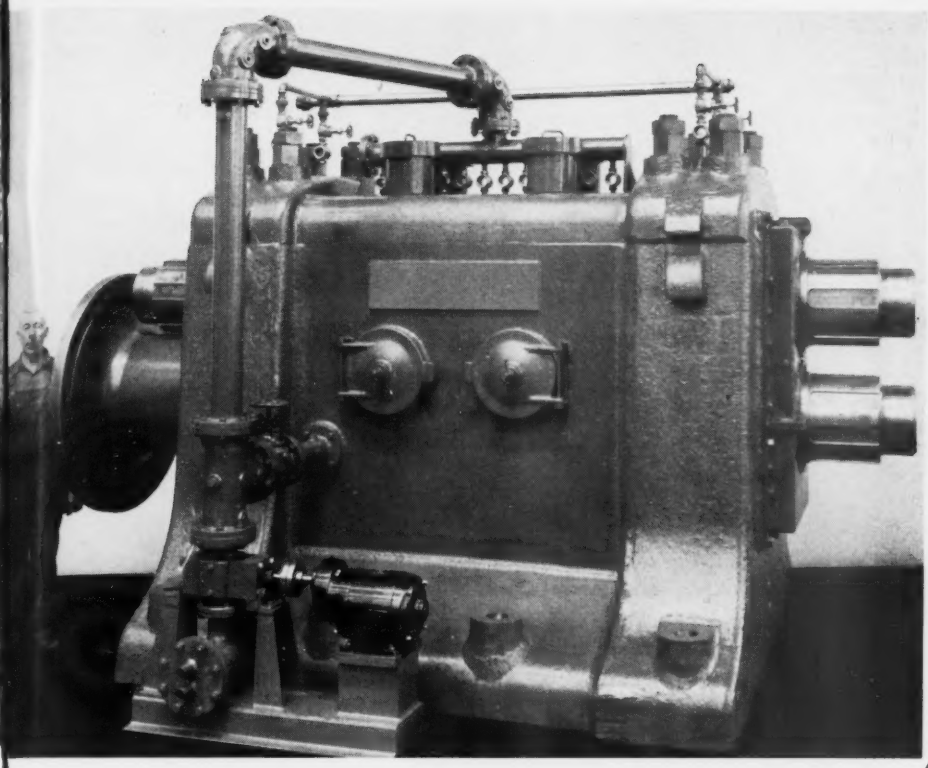


Fig. 3—Pinion stand is constructed of two cast steel end pieces connected by rolled steel cross members

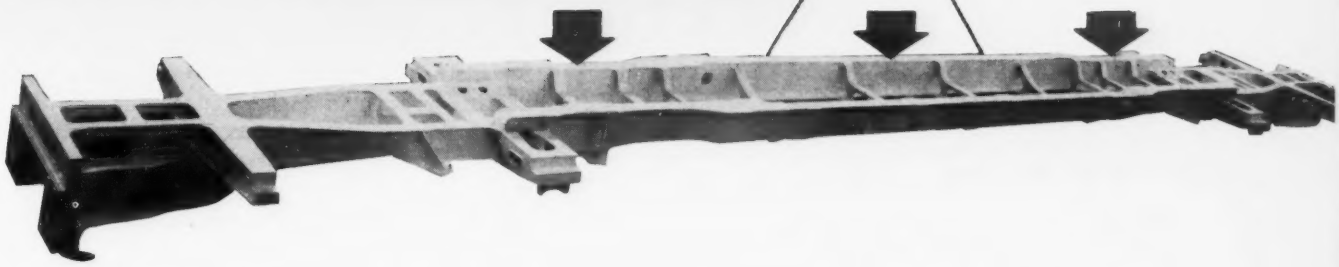


Fig. 4 — Locomotive underframe made in four cast sections welded into a unit at the points which are indicated by arrows

RADIOGRAPHY and magnetic powder inspection make it possible to locate all serious defects in steel castings, and to check completed repair welds for pinholes, cracks and other imperfections. Sound welds, made with the proper types of coated electrodes, have such excellent mechanical properties that for some years past the welded portion of a casting has been accepted as the equal in strength and reliability of the unwelded parts. The same is true also of welds joining together separate pieces of rolled or cast steel.

In fact, the use of cast-welded construction has become so commonplace that in answer to requests for photographs of typical installations, the author recently received the following reply from one concern: "I had an opportunity to go over to our weldment shop to look over pictures which might be of service to you. I find that weldments using castings are so common that except for unusual cases we do not make any photographic record."

The present author, needless to say, was particularly pleased at reading this statement, in view of the frigid and hostile reception accorded to the paper that he and T. S. Quinn wrote on "Combining Castings and Weldings" in *Industry and Welding,* second quarter, 1936. This summary of progress in cast-welding practice stirred up a hornet's nest of protest from a great many of the old-fashioned foundrymen who reacted furiously to any and every effort to "encourage welding," at a time when welding was doing quite nicely without their encouragement.

Not only industry in general, but both the weldery and the foundry have profited by the co-operation that has now largely superseded the cut-throat competition of a few years ago. The designers of weldments have come to see the costly inconvience of building up oddly-shaped parts out of a number of small pieces, and now use castings for the complicated portions of their assemblies. On the other hand, comparatively thin sections of large area are so prone to the development of center-line shrinkage when made as castings, that steel plate and other rolled material are today universally substituted for them. The foundry is thus spared the necessity of employing measures, frequently unsuccessful, of preventing center-line shrinkage and similar types of unsoundness, and no longer needs to locate and repair numerous internal defects.

Coring Minimized—Of even more importance to the foundry, awkward and costly molding jobs that require extensive coring are now entirely avoided by producing the desired article in several sections, each relatively easy and economical to mold. The constituent portions, with or without a certain amount of structural material, are then joined together by welding. The customer thus is given an article that is

Fig. 5—Turret ring for a ship was moved as six castings then thermit-welded at the shipyard

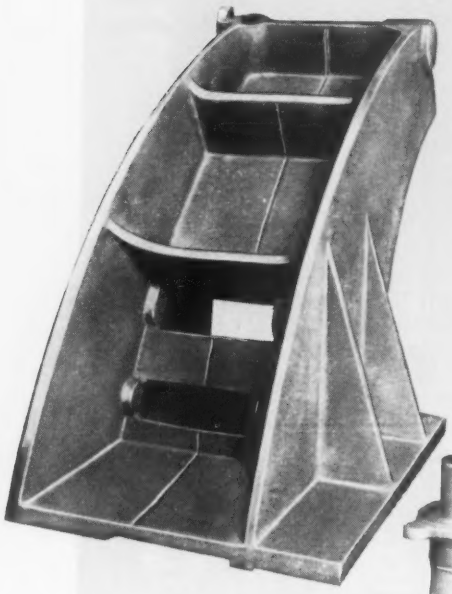


Fig. 6 — Strip repeater, cast in two pieces, was welded along centerline

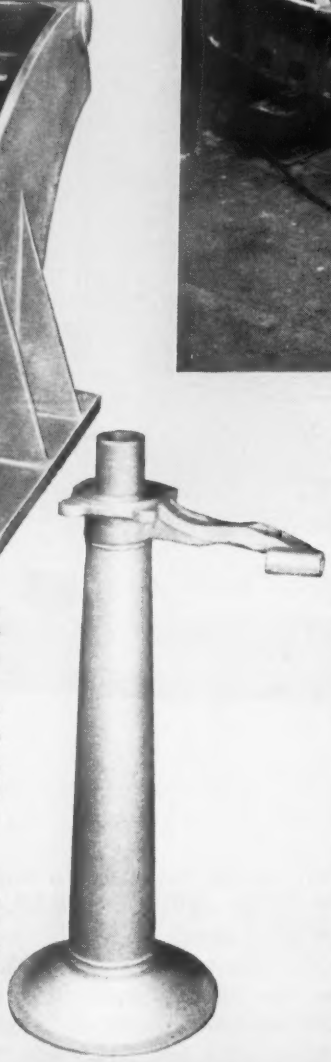


Fig. 7—Assembly for an automobile rear axle is made of steel tubing, a forging and cast steel hub and spring perch

Fig. 8—Gun recoil mechanism consists of three cast parts and a piece of tubing, as shown at left, welded into a unit

more reliable and cheaper than either an integral casting or an assembly in which no cast parts are used.

In some instances, the composition of the steel from which a piece must be made is such that strong, reliable welds are difficult and costly to produce. High-carbon steels and many of the harder alloy steels, for instance, can be welded successfully only by preheating the parts to be joined, and by taking other precautions outlined in an earlier chapter. Other alloy steels, such as austenitic 12 per cent manganese steel, can be welded, but the welds do not quite equal the parent metal in strength and reliability. Obviously, cast-weld methods cannot be successfully applied to steels of these types. By far the greater proportion of the castings used in machine parts, however, can be welded satisfactorily, either to other castings or to structural steel.

A typical instance of the application of the principles outlined above, is the cast-welded assembly shown in Fig. 1. This piece, a freight car center filler, originally was made as an integral casting, but the foundry that produced it had lost the business to a maker of welded assemblies. The latter, however, furnished a part composed of 17 separate pieces, which required 672 lineal inches of weld. After careful study, the foundrymen designed the assembly shown in the illustration, consisting of three castings, joined together by only 34 inches of welding, and 33 per cent lighter than the competing article.

To make the three separate castings, only 3 lb of cores were needed, whereas the original one-piece cast article had required 308 lb. The amount of molding sand used was also greatly reduced, and the daily output increased. The illustration shows the completed piece. After solving the problem of producing this part at a price to compete successfully with other methods, this foundry redesigned a number of similar freight car pieces and made them as assemblies of economically molded castings. This one example illustrates strikingly the inefficiency and costliness of an assembly in which the possibility of using castings is lost sight of, and the advantage to

the foundry of combining the arts of the foundryman and the welder to make a lighter part at a lower cost.

The frames and bases of various machines often include heavy and complicated parts connected by light portions of considerable area that are apt to be unsound if the piece is made as an integral casting. Frequently also, they are so shaped as to be quite expensive to mold in one piece, and are therefore especially well suited to the application of the cast-weld principle. For example, the large pinion stand shown in Fig. 3 is built up of two heavy end castings, connected by cross members of 1½-in. rolled steel plate. As will be seen from the illustrations, the thin connecting members would probably contain center-line shrinkage if the piece were made as an integral casting, and the cost of patterns, coreboxes and molding would be very high. The two heavy end pieces were readily and cheaply molded, and the cost for welding the parts together was more than balanced by the saving in the foundry effected by making two castings instead of one large one. In addition to the end parts, the bearing caps and the foundation bolt pieces on the plate sections were also made as castings, and welded on.

A somewhat similar machine frame, in which castings were used only for the more complicated portions, is shown in Fig. 2. In both this and the preceding illustration, it is obvious that the welded assembly is much lighter than the piece would have been if made as an integral casting, since cast members would necessarily have been thicker than the structural material used. At the same time, molding and core costs in the foundry were reduced to a minimum when only the intricate portions of the piece were made as castings.

Casting Components—For somewhat different reasons, the cast-weld method is now widely used in the manufacture of castings either too heavy for a given foundry to produce, or too bulky for the railroads to handle if made integral. Today, these complicated pieces are often molded and poured in several sections, which are then welded together, either in the foundry or at the place where the finished article is to be used. Thermit welding is used to produce ship frame castings in this manner. Only a few foundries in the country are capable of producing these big ship frame pieces as integral castings, and many of the larger frames are too bulky to be handled by the railroads, so that only shops at or on tidewater have been able to make them. By dividing them into sections, which are welded together either at the foundries or at the shipyard, it is now possible to distrubute this work over a number of shops, and thus relieve a serious bottleneck that formerly caused great delays in obtaining these vitally important parts.

A somewhat similar problem is illustrated in Fig. 4 which shows the assembled view of a cast-welded piece slightly over 76 ft long, composed of four separate castings. This assembly is one of 36 underframes made for 2000-hp diesel locomotive engine units. Separate castings forming the assembly are each about 19 ft long, and are welded at the approximate points indicated by the arrows. The vertical webs of the Z-shape side members were ⅝-in. thick, the top and bottom flanges ¾-in. thick. In some cases the middle portions of these large frames are made up of assemblies of structural steel, welded together and to the complicated end portions, which can be more economically made as castings. The choice between structural steel and cast parts for the center portion depends upon the relative cost of the two materials, and is affected by the number to be made. When the order covers only a few pieces, the cost of the necessary patterns and coreboxes for cast parts would often make structural steel the preferred material. In the case of the piece shown here, a cast steel center portion was decided upon, because the necessary structural steel was obtainable only after a delay of several months.

Because even the highly skilled personnel of the shop in question could not produce so long a piece with such light sections as a single casting, it was decided to divide it into four parts. Only two patterns were required, since the center portions were reversible; and by changing one or two loose pieces, both ends could be made from a single pattern. The latter were molded as core assemblies; the center portions were made up in skin-dried green sand. To weld the several parts together, the side members were trimmed to an S-shape. Thus each weld consisted of two vertical portions, offset from each other and connected by a horizontal part 12-in. long, located at the neutral axis of the section. The welds were made by the metallic arc method, using suitable coated electrodes.

Heavy pieces like ship frames could also be welded by the metallic arc method, but it would take so long to complete the welds in such thick sections that thermit welding is much the better method to use. There is no hard-and-fast dividing line, however, between sections that should be arc welded and those for which thermit is preferable. The choice depends upon several factors, such as the number of welds to be made, the availability of skilled men to make the thermit welds, and so on.

Fig. 5 shows another job too large to be produced and shipped as a single casting. This is a lower turret ring for a large vessel, which was made and shipped in six parts, and welded together at the shipyard. In this case the sections involved were such that thermit welding was chosen in preference to the arc method. The illustration shows two of the molds for the thermit welds being heated up with torches, and four completed welds, with the gates and sprues still in place.

How To Make It—Generally, the best way to make a given piece can be determined only after carefully reviewing the costs of each of several alternate methods. The equipment available in the plant may greatly affect the costs. Thus one concern determined that it was more economical to make the strip repeater shown in Fig. 6 as a pair of castings welded together along the center line, than as a single casting or an assembly composed entirely of rolled plate. Obviously it was cheaper to make it in this way than as an integral casting, since the saving in core and molding cost was very great.

Apparently, however, this piece could have been produced as an all-plate assembly, and had suitable equipment for shaping and bending the material been available, that might have been the cheaper method. In this case, the extension of the base and the two triangular braces between the base and the side member made it impossible to mold one of the castings as a "flat-back," and it is quite probable that internal shrinkage would be present in parts of the castings, especially at the intersections of the several parts. However, the all-casting assembly has proved perfectly satisfactory and given a good account of itself in service.

In some cases, complicated and expensive jigs and fixtures are required to keep the component parts of an assembly in proper position during the welding operation. When a number of identical pieces are to be produced, the cost of these fixtures is readily absorbed. If there are only one or two on the order, however, the choice of the cast-weld method may not be justified. A suction dredge cutter head is a case in point. To mold such castings, some of which are quite complicated, is a slow and expensive job, and one that calls for skilled men. The hub and blades, however, can be made cheaply as separate castings, and the bottom ring is readily formed from flat bar stock. To keep the various parts in proper position for welding, however, requires fixtures so expensive that the choice of the cast-weld method would have been justified only if the order had called for say 40 or 50 pieces, instead of just one or two. Using makeshift methods instead of the proper equipment, welding took so long that the finished piece cost more than would have an integral casting.

Small Castings—Not only large heavy castings, but also light and small ones, are often most economically made by combining castings with rolled or forged material. Fig. 7, for instance, shows a rear axle assembly used for 15 years in a well-known light car. This piece consisted of a forged base, a section of tubing and a cast steel hub and spring perch, all welded together. The cast portion was made of 0.40 per cent carbon steel and, before being assembled in the finished article, was machined and induction hardened on the outer hub diameter to a hardness of 58 Rockwell C.

To the same company, the author is indebted for Fig. 8, showing a portion of a gun recoil mechanism. This piece, when made as a welded assembly under the urge to avoid the use of steel castings, consisted of 12 parts, including stampings, forgings and seamless tubing. As redesigned to reduce welding costs, a section of seamless tubing and three cast parts, as shown on the left in the illustration, were welded together to form the finished assembly pictured on the right hand side. It would be hard to find a better example of a judicious choice of materials to form this intricate and important part.

Many foundrymen are all too familiar with the difficulties encountered in molding such complicated pieces as the throttle valve and strainer assemblies, one of which is shown in Fig. 9. To mold these pieces as integral castings is extremely difficult, and to locate properly enough sink-heads on them to eliminate unsound places is often impossible. As a result, they are always more or less unsound and the defects must be located by radiography and magnetic powder inspection, burned or chipped out, and repaired by welding. To avoid these difficulties, it is now general practice to mold and pour these complicated castings in a number of pieces, which can be so "headed" as to be free from internal defects, and to assemble the several parts by welding. As can be seen, the casting in Fig. 9 was made in three main parts, with several brackets molded separately.

Fig. 9—Throttle valve and strainer assembly is fabricated from three castings welded together

In discussing the manufacture of throttle valves and similar castings, the comments of the late S. W. Brinson, and J. A. Duma, *Transactions*, AFS, vol. 48, 1940, on the subject will bear repetition here:

"Not infrequently, the foundryman is asked to cast a structure whose design defies every attempt to control the direction of its solidification. Throttle-valve bodies are an outstanding example of such a design. Since the chemistry of these castings is one that lends itself quite readily to welding, the most economical method, and sometimes the only method whereby a sound condition of structure can be obtained in these complicated designs, is to dissect them into several more simple and elementary sections, cast each individually, and then unite them with welding. This is precisely what was done to the throttle-valve shown in Fig. 29. (Editors' note: The illustration referred to is not included here.)

"All the steam inlets were cast separately. The front and back plates, seats, brackets and nipples were cut from carbon-molybdenum steel plate. Regarding the body proper, it was made solid by means of four parting gates, 130 lb of outside padding, and eight bulky risers, covered with head liquidizer compound. Welding was performed in flat position using $^3/_{16}$ and $^1/_4$-in.-diam electrodes, and 300 to 500° F of oxyacetylene preheat. All welded joints were then x-rayed for soundness and the entire weldment stress relieved at 1250° F. . . Other important castings, which are being cast in sections and welded together into composite structures, are certain types of turbine casings, and possibly lower turret track ring sections. Thermit welding is being contemplated as a method for joining the latter."

The last two sentences of this quotation seem prophetic, in view of some of the illustrations in this

Fig. 10—Propeller strut for large ship is welded from two single castings

Fig. 11—Right, original design for a unit casting

Fig. 12—Left, simplified design for the same part makes use of two castings welded together as a unit

article discussing this particular subject.

These bulky and complicated castings, which carry steam at very high pressure and temperature, and therefore must be absolutely sound and tight, have long been a headache to the foundrymen who are obliged to make them. Without welding, either to repair serious defects or to join together a number of parts to make a single member, it would be quite impossible to produce them.

Another instance in which welding has come to the foundrymen's rescue in the manufacture of a difficult casting is illustrated in Fig. 10, which shows castings to form a propeller strut for a large ship. Not many years ago these pieces were made as an integral casting, and molded with the barrel in a vertical position. A large sink-head was placed on each "palm" at the ends of the arms, and another covered the top of the barrel. To obtain directional solidification, the walls of the barrel were greatly thickened at the top, tapering toward the bottom, so that the internal "lands" had to be formed entirely by machining. Contraction in the mold resulted in the formation of numerous tears and cracks in both the arms and the barrel, which required extensive repair welding.

Largely through the initiative of the late Paul E. McKinney, the standard method of producing these castings is today that shown in the illustration. The barrel is split lengthwise, and the half barrel, arm and palm are molded in a horizontal position, with the concave side of the barrel and the lands down. Heads located on the palm, arm and barrel make the casting solid, and it is possible to cast the lands with only the usual allowance for machine finish, thus enormously decreasing the cost of machining. When cast in this manner, the cracks and tears in the arms and barrel are held to a minimum, and the job of making the two vertical welds in the barrel is a comparatively simple one. The overall saving in the cost of making struts, due to the adoption of this method of production, has been very great.

In some instances, designers and foundrymen working together have decided not only to produce a casting in two or more parts instead of one, but to greatly simplify the design and thus effect savings in molding and core cost. An example of this practice is shown in Figs. 11 and 12. The former shows a mill feed end as originally designed and produced as an integral casting, and Fig. 12 illustrates the simplified design, molded as two castings to be joined by welding.

It is hardly necessary to point out the savings in molding and core cost due to the elimination of the pockets under the arms in the older design, and any foundrymen will readily see that the two plain pieces can be made in simple molds, far more readily than the one more elaborate casting. Could every designer of machine parts have a chance to work in close association with skilled foundrymen, it is safe to assume that we would have far fewer of the mechanical monstrosities that have vexed the brotherhood for so many years past.

In fact, in this respect the foundryman has not been as enterprising as the welding people. The latter have constantly urged and secured radical modifications in the design of assemblies they have been called upon to make, and it is only in the past few years that the foundrymen have awakened to the possibilities of helping themselves by asking for and obtaining similar changes in the design of the things they have to produce.

Sources of Illustrations

Figs. 1, 3 and 6—Steel Founders' Society of America.
Figs. 2 and 5—Metal & Thermit Corp., New York.
Figs. 7 and 8—Ford Motor Co., Dearborn, Mich.
Fig. 10—Bethlehem Steel Co., Bethlehem, Pa.
Figs. 11 and 12—Falk Corp., Milwaukee

WHAT MAKES A PLANT SAFE?

By W. K. OUSLEY
Vice President
Boston Manufacturers Mutual Fire Insurance Co.

To minimize the hazard of fire, industry should follow five fundamental rules. The author's recommendations comprise a paper presented at the recent annual meeting of the Society of Automotive Engineers held in Detroit, Jan. 11-15

A STUDY of all major fires in industrial history will show that every single one could have been avoided if five simple fundamental rules had been followed. These rules have been common knowledge for at least fifty years. To be sure, industry has reached a complexity undreamed of fifty years ago and we can only guess what lies ahead as we stand at the threshold of the atomic age. Even so, the same few fundamentals still stand. The purpose of this article is to show how any plant engineer can apply them to his own operations—and practically guarantee that catastrophic fires will not occur.

Our grandfathers seem to have had a greater awareness of these things than we have today. The reason for this is probably twofold. In the first place, business then was less complicated and plant owners were closer to all phases of management.

In the second place, insurance coverage was not nearly as broad as it is today so that, inevitably, any loss cost the plant owner a great many dollars. Today, management is too complicated for any one individual to be intimately connected with all phases of operation. And, too, present insurance coverage is so complete that property owners need suffer little if any dollar loss in case of fire.

Many companies have designed their plants without regard to the unusual and the unexpected. Of course, the frequency of catastrophic fires is not great—a fact which lulls us into a sense of false security and the belief that "it can't happen here." Yet quality control in these same plants is based on the knowledge that "what can happen may happen." No better guide than this can be found in designing and protecting your manufacturing plants: First determine what can happen and then use the following simple rules to prevent it happening if possible—or, to insure that if fire does occur, you won't be put out of business.

Use Safe Construction—From a fire standpoint, it doesn't make too much difference whether you construct your buildings of brick, steel, concrete or wood—as long as you avoid wooden walls and quick-burning boards on joists, roofs and floors. Most construction can be adequately protected with automatic sprinklers. However, while sprinklers are extremely reliable, they are subject to human frailties and mechanical failure, so fire-resistant dividing walls are necessary as a second line of defense. Only in this way can you be certain of avoiding total destruction

in the event of a fire that strikes at your plant.

A basic question you must ask yourself is "How much of the plant can I afford to lose?" In considering what it is possible to lose you should disregard sprinklers because, sooner or later, someone will circumvent any mechanical protection you can provide. It follows that you can lose whatever portion of the plant is not separated by fire-resistant walls or open areas. How large, then, should one fire area be? There is, of course, no specific answer but the following general rules might well apply.

1. When contents in a combustible or a noncombustible building are generally combustible, (under the best conditions) a single fire area should not exceed 100,000 square feet. Valuable concentrations of combustibles or hazardous operations will greatly reduce the permissible area.

2. When contents in a noncombustible building are generally noncombustible, areas may be as large as desired if concentrations of combustibles are segregated within fire-resistant walls.

3. In multi-story buildings, stairs, elevators and other floor openings should be enclosed with materials at least as fire resistant as the floors.

It should be borne in mind that if sprinklers are out of service and a fire must be fought and controlled by hose streams from outside, the fire fighting will not be effective if the building is much over 200 feet wide.

In considering the size and arrangement of fire areas, operations should be designed whenever possible so that destruction of one fire area will not result in complete loss of production.

Install Sprinklers for All Combustibles—Automatic sprinklers are your main line of fire defense. They do more to protect plants and employees than any other single factor. The reasons are simple. Sprinklers always are on guard ready to go into action whenever fire starts. They strike at the seat of the fire unhindered by heat or smoke. They cover the entire burning area. They eliminate unnecessary water damage because only the sprinklers that are needed will go into operation.

But to be effective, coverage must be complete wherever there are combustibles. If fire burns unchecked in an area not protected with sprinklers, in adjoining areas the resulting heat will open more sprinklers than can be supplied with water.

Provide Enough Water—Most fires in industrial plants are controlled by one or two sprinklers which leads to some misunderstanding as to the total volume of water required. Good fire protection does not consist of an arrangement which will permit an occasional fire to get out of control and possibly destroy an entire building. An average water demand for sprinklers over moderate combustibles is about one quarter gallon per square foot of floor area, per minute. Therefore, if sprinklers were called upon over 8000 square feet of floor area, the water demand would be 2000 gallons per minute which only the strongest water systems can supply. Further, highly combustible materials will require even more water. As an example, rubber tires piled to a height of 12 feet would require about ½-gallon per minute per square foot of floor area.

Adequate water supply is one that will supply all the sprinklers likely to operate for the probable duration of the fire and will simultaneously supply the quantity of water which would be used for hose streams. The usual hose stream discharges 250 gallons per minute or more. The quantity that is likely to be used both by plant personnel and the fire department must be estimated and water for that purpose provided by one means or another without interfering with the supply that will be needed for sprinklers.

In many cases the public mains alone will not provide all the water needed for fire protection, and it is for that reason that elevated gravity tanks or pump suction tanks located at ground elevation have come to be a common sight at large industrial properties. These secondary supplies also mean that water always will be available for sprinklers even though public water is out of service.

Train Your People in Fire Safety — Personnel trained in safety measures will prevent fire and accidents and can nearly always bring a blaze quickly under control. People schooled in handling the types of fires to which a particular plant is subject have repaid the effort of organization many times over. True, you can depend on the public fire department, but never during the vital first few minutes.

The first step for all plants, however small, is to organize fire squads of five or six key employees in each department. Make them "on the job" inspectors to report and correct conditions which start fires and cause accidents. Provide proper educational material for them to study. Teach them the use of extinguishers, good housekeeping, and the importance of automatic sprinklers. Well trained men will keep their heads in an emergency and any blaze will have small chance of survival.

Plants having private hydrants and hose systems need trained men to use them quickly when needed. The fire squad men also can be members of the larger plant fire brigade. They should be familiar with the entire plant protective system. Drill them frequently; handling a large hose stream is never a job for an amateur. Plan the organization so that each man will have a definite task. Competence through experience will greatly reduce the chances of a fire getting out of hand.

When the plant is not operating, it should not be turned over to superannuated employees unable to cope with emergencies which might arise. A good watchman is a mature, able bodied man of common sense, not likely to become "rattled" in an emergency. He should be completely familiar with the entire plant protective system and should know how to operate extinguishers. Periodically he should be given a refresher course to make sure he will be ready when an emergency occurs.

Responsible maintenance men should make careful weekly inspections of safety and fire protection equipment to be sure it is kept in good working order. A good report form, standardizing the inspection and filled out during the inspection, will reduce the danger of important omissions. The importance of these inspections cannot be over emphasized. For example, a thorough inspection will (*Please turn to Page* 309)

ALLOY GRAY IRON

. . . What Does it Cost?

TYPES of alloy cast irons produced by gray iron foundries range from metals containing as little as one-quarter of 1 per cent of one alloy up to special cast irons containing as much as 20 or 25 per cent of one or more alloys. Methods of production also vary widely.

In some foundries the melting of alloy metals is kept entirely separate from the melting of the regular base metal by melting them in a separate furnace—electric furnace, air furnace, or a separate cupola—or by running special heats in the regular cupola. But the method most frequently used is by the addition of small amounts of alloy to the regular cupola base metal in the ladle, commonly referred to as "ladle additions."

This article is concerned primarily with the procedure for determining the cost of special alloy metals when they are produced by adding alloys to the regular base metal.

Definition of Terms—A definition of some of the terms commonly used by producers of alloy castings will clarify the explanation of the correct procedure.

Base Metal—The metal used for all castings for which no special analysis is specified by customer or needed to meet special requirements.

Special Alloy Metals—Metals that contain elements not contained in the regular base metal.

Base Metal Rate—The estimating rate for cost of melted metal per pound (or per 100 pounds) of good castings produced, which is used for castings made from the regular base metal.

Special Metal Rate—It is standard practice to treat the cost of alloys as a metal item in cost calculations by determining a special rate for cost of melted metal for each special alloy metal produced. Where a special alloy is produced by adding alloys to a base metal, this special rate is determined by adding to the Base Metal Rate an additional amount representing the additional cost (per pound of good castings produced) incurred due to the addition of a specified percentage of alloy.

Alloying Material—Alloys are usually purchased in the form of an alloying material which contains a certain percentage of the desired alloy.

Contained Alloy—This is the percentage of pure alloy in the alloying material as reported on the purchase invoice or determined by analysis.

Gross Weight—This is the gross weight of the alloying material and includes the weight of other elements as well as the weight of contained alloy. It is common practice for sellers of alloying material to bill it at a price "per pound of contained alloy" rather than at a price "per pound of alloying material." However, to avoid errors, it is advisable for the melting department at all times to report the gross weight of alloying material used.

Melting Loss—This is the loss of *alloy content* from oxidation in the melting process. This will vary with the type of alloy and the melting process used but will usually run between 5 and 10 per cent. There is of course no melting loss when alloys are added in the ladle.

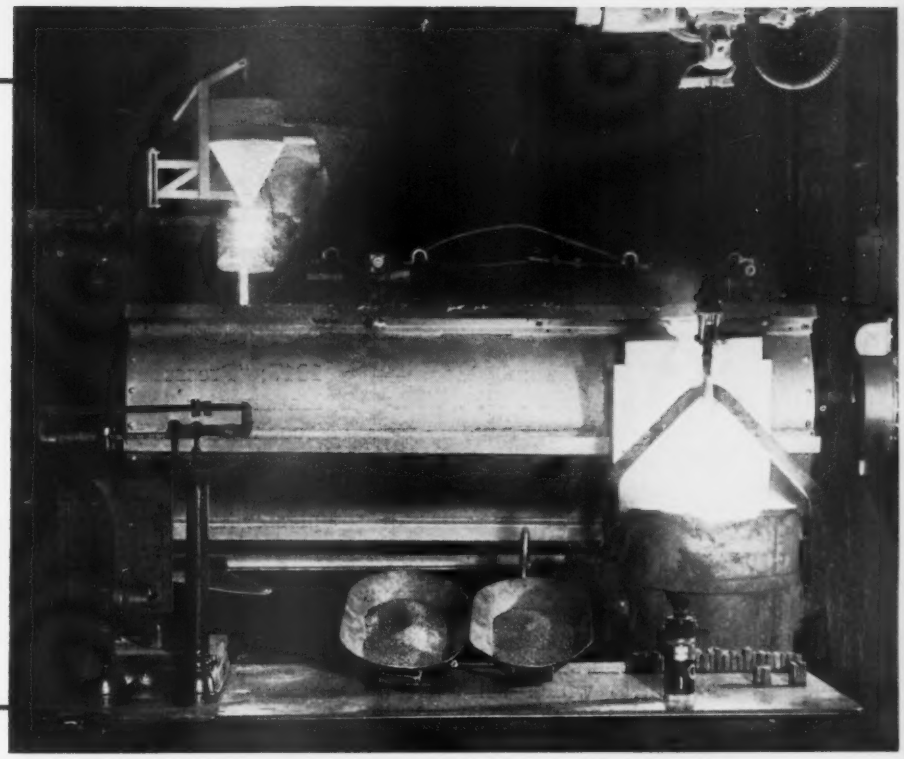
Ladle Loss—This is the loss of *alloy content* in the ladle from oxidation and by absorption of alloy in the slag which is skimmed off. When alloys are added to the furnace charge the ladle loss is negligible.

Handling Loss—This is the loss of *metal* from spills, ladle skulls, over iron not recovered, etc.

Recovery of Recycle Alloy—This is the possible recovery of alloy present in gates, sprues, scrap castings, etc., which may or may not be recovered depending on the process used, the type of alloy, and the amount produced.

Calculating Base Metal Rate—The procedure for

Cost Committee of the Gray Iron Founders' Society believes that many foundries producing alloy gray iron castings do not fully understand the various alloy losses that occur in the melting process, in the ladle and in handling. In addition, the recovery of alloys that foundries expect from gates, sprues, etc., is not realized in practice. In the interest of arriving at more accurate costs in producing these castings, the accompanying discussion has been prepared. It will be incorporated in the society's forthcoming Cost Manual No. 2



calculating the Cost of Melted Metal for the regular base metal has been described in Cost Manual No. 1 (Basic Method) and in the preceding part of this section (Yield Method). The cost of the base metal should include the cost of any alloys "that are part of the regular base metal" (See definition of Account 100, page 31 of Cost Manual No. 1). In most foundries the only alloys used in the regular base metal are ferrosilicon, ferromanganese, or ferrocarbon, and these are usually used only to bring the silicon, manmanese, or carbon up to the content desired in the regular base metal when this content cannot be obtained from the pig iron or scrap the foundry is using.

These alloys should be charged to Account 100 (Metal) and their cost is therefore included in the Cost of Melted Metal from which the foundry determines its regular estimating rate used for all castings made from the regular base metal. This rate is usually referred to as the "Base Metal Rate" for Cost of Melted Metal.

Calculating Rates for Special Alloy Metals—The cost of alloys used in special alloy metals does not enter into the cost of all castings and therefore should not be charged to one of the regular cost accounts. It should be charged to a special account—"Account 602—Alloys Used in Special Metals" which is one of the "Extra Cost Accounts" (see pages 13 and 33 of Cost Manual No. 1).

The procedure for calculating the cost of special alloy metals varies somewhat depending on whether the alloys are added in the ladle, to a separate charge in the cupola, or melted in a separate furnace. Each procedure is described separately.

For Ladle Additions—The following procedure is based on the practice of those who have had long experience in producing alloy castings. It includes certain general safeguards and practices which they have found necessary.

When alloys are added in the ladle, it has been found impracticable in the vast majority of cases to recover the alloy content in the recycle of sprue and scrap. The following procedure therefore makes no allowance for such recovery. The conditions under which such recovery is practicable will be discussed later.

In calculating the cost of alloys added in the ladle, it should be kept in mind that this cost must include:

1. The cost of alloying the total amount of metal required to pour the castings, including gates, sprues, risers and over-iron.

2. Allowance for loss of metal from spills, ladle skulls, etc.

3. Allowance for loss of alloy content in the ladle from oxidation and by absorption of alloy in the slag which is skimmed off, etc.

4. Allowance for loss from defective castings.

To make clear the effect of these various factors, let us apply them to the case of a specific alloy casting having the following cost data:

Specification—1 per cent of alloy X in the casting. Alloying material contains 50 per cent of alloy X. Cost of alloying material is $1 per pound of contained alloy. (Equivalent to $.50 per pound of alloying material). Weight of casting—100 pounds. Yield of casting—50 per cent Base Metal Rate—Estimating rate for cost of melted metal for regular base metal—$4.50 per 100 pounds of good castings produced.

To obtain an alloy content of exactly 1 per cent (or 1 pound) in this 100-pound casting, it is necessary to add considerably more than 1 pound of alloy in the ladle for the following reasons:

1. Since the yield of this casting is 50 per cent, 200 pounds of alloy metal must be poured into the mold to get 100 pounds of cast- (*Please turn to Page* 311)

QUESTIONS

Needs method of supporting suspended cores

Making aluminum matchplates . . . . . Solder will not tin

Metal Recovery . . . . . Pinholes mar surface

Methods for Supporting Core

QUESTION Will you please advise us if there is anything on the market which can be used to hold up a core while it is suspended (similar to a chaplet) which will melt on contact with the molten metal and will not affect the analysis? This casting is copper and must be water tight.

ANSWER We do not know of any material for chaplets which will melt on contact with molten copper, and not change its composition, except copper itself. You do not mention whether or not you have tried that, but we assume that you have, and find that it does not fuse sufficiently to eliminate leakage.

Copper is a good conductor of heat and possibly the chaplet you are using is heavier than necessary. If it is a wire form, try using a smaller diameter wire, or if sheet form, thinner sheet. Material, of course, should be clean to prevent kicks. The only other method of supporting the core without chaplets would be to use rods or arbors extending through core prints.

Making Aluminum Matchplates

QUESTION We are interested in making our own matchplates by the pressure casting process, and will appreciate any information on the procedure employed.

ANSWER Some of the details relating to production of pressure-cast matchplates have been presented in the following articles in FOUNDRY: "Pressure Casting Aluminum Matchplates" by Callahan — July, 1945; "Pressure Casting Matchplates" by Bremer — April, 1947; "Pressure Casting Aluminum Matchplates in Plaster Molds" by Touchman—July, 1948.

Briefly the procedure consists of making the requisite number of plaster half or piece molds from the pattern. These are assembled together, properly spaced, face down on a glass-topped table and surrounded by a frame or flask of the desired dimensions. Glass is used because it is smooth, flat and not affected by the wet or damp plaster. After assembly plaster is poured around and over the piece molds to hold them in place and to make them into an integral or single mold. If the plate is to be a single face, a flatback of plaster is made to form the cope. If the plate is to be double face, another set of piece molds is made as previously described—turning the pattern over, of course, if it is unsymmetrical.

Piece molds for matchplate are laid out properly on glass-top table

Gating systems for both the patterns on the matchplate and for pouring the matchplate are tooled in the plaster mold. This is easily done since the plaster, while "air set" and rigid enough to be handled, is still damp and can be cut easily with gouges, etc.

The two molds or mold and flatback are placed in an oven and dried thoroughly—usually 10 to 14 hr in a core oven at temperatures from 400 to 600° F. The molds are taken from the oven and while still hot are assembled with a spacer between. Spacer usually is asbestos board of the thickness of the desired plate. Generally the spacer is made in four pieces; two of them straight for the sides, and two contoured to form the "ears" on the ends which later are equipped with flask pins.

Molds then are clamped together, the metal-pressure chamber set over the sprue with a 1/16-in.-thick asbestos disk between the opening in sprue and that in the chamber. Pressure chamber is cylindrical and may be made of ¼-in. steel plate. Dimensions are such that it will hold all the aluminum alloy required to pour the plate. Top is flanged so that a cover can be clamped on. Cover contains an opening to which a valve and short length of pipe are attached for connection to the shop's compressed air line.

Pressure chamber is filled with the required amount of aluminum, the cover clamped on, and the metal allowed to cool somewhat to what the matchplate makers term the "mushy" state. Then about 4 to 6 psi air pressure is admitted to the chamber; this causes the metal to rupture the asbestos disk and flow into the mold.

ANSWERS

Aluminum Alloy for Flasks

QUESTION For some time in our iron foundry in the Netherlands we have been using a 10 per cent silicon-aluminum alloy for flasks, but they are not strong enough. During a trip through the USA we saw numerous aluminum alloy flasks in use, and we would like to know what composition is employed for the purpose.

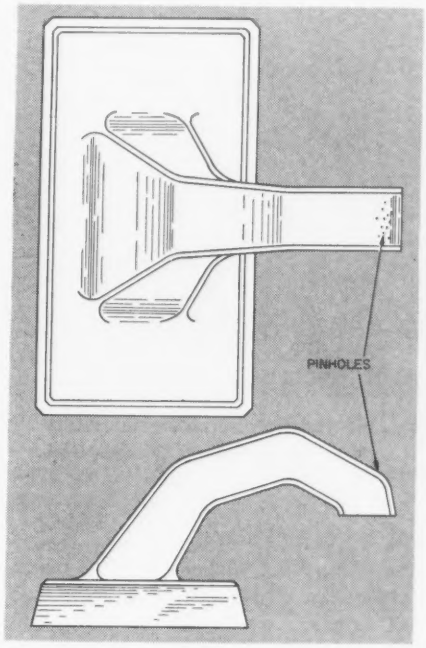
ANSWER Since there are a number of aluminum-alloy flask manufacturers in this country, it might be expected that the compositions employed for the purpose are not necessarily the same. However, one maker indicates that an aluminum alloy containing 4 per cent Si and 4 per cent Cu with 0.8 per cent Fe max, serves satisfactorily for flasks. Another copper-silicon-aluminum alloy which might be tried is that containing 6 to 7 per cent Si and 3 to 4 per cent Cu.

Pinholes Mar Faucet Surface

QUESTION We are forwarding a centerset lavatory faucet which is causing us considerable trouble in that pinholes appear in the upper portion toward the end of the spout. Metal is melted in an indirect arc furnace and transferred into graphite crucibles. Flasks are 12½ x 18 in. Pattern contains four pieces. Molding sand is No. 1 Albany.

ANSWER Examination of the faucet reveals the casting to be of generally high quality, indicating careful foundry practice. From all indications there is a minimum of dissolved gas, showing good melting control. From the location of the pinholes in the top of the spout we believe these defects result from non-vented gases produced by molten metal in contact with the core. In the manufacture of plumbing goods such as this it is usually necessary to have a complex core which can be vented only at the prints into the mold itself. In some cases foundries use core wax; in other cases, because of the complexity of shape, it is necessary to use wire reinforcement. In either circumstance whatever gas is produced by the core has to be vented through a rather long narrow channel.

Gas produced by the core is under some pressure and tends to rise toward the cope where it will pass through the molding sand, provided the permeability is satisfactory. If the gas is not able to escape through the mold, it tends to go into the metal where it is trapped as bubbles just under the skin when the metal freezes. That condition may be aggravated if an ingate is located so as to impinge metal on the core, causing increased gas generation at that point.



Pinholes occurring near end of the spout are created by gas

Eliminating your trouble is a matter of either reducing the amount of gas generated by the core or insuring removal of whatever gas is produced by venting techniques. To reduce the amount of gas produced, use of less oil or of longer baking cycles may be helpful if a satisfactory core can be obtained. Venting may be accomplished by use of core wax if possible, or by making certain that the permeability of the green sand mold itself is adequate to permit escape of the gases. If an ingate should cause impingement of metal on the core in the area near the spout, it may be causing local overheating, and therefore excessive gas generation.

Malleable Iron Embrittlement

QUESTION We are manufacturers of malleable iron castings and of late are having some trouble on which we would like a suggested remedy. Normally the fracture test for determining whether or not castings are properly annealed, is always black, but recently some pieces are showing a white fracture. Microscopical examination reveals complete ferritization, and under high magnification the only difference between the usual black fracture and the white is that in the white ones the manganese sulphide has segregated in the grain boundaries of the ferrite, whereas in the black fracture, it is inside the grains. White fracture pieces also show increased notch sensitivity.

We do not exactly understand the mechanism of this grain boundary phenomenon. Our normal annealing cycle is heating to 950°C (1740° F), keeping it at that temperature for about 50 hr and slowly cooling to 730°C (1355° F) in about another 50 hr, holding at that for about 24 hr. Total carbon of the iron is about 2.9 per cent and silicon 0.8 per cent maximum.

ANSWER The peculiar fracture to which you refer is the well known white ferrite fracture observed after hot galvanizing, and is the embrittlement of the metal containing both silicon and phosphorus when held in the region of 900° F (482° C), and then cooled other

than enormously slowly. It can be cured by reheating the metal to 1200 to 1250° F (649 to 677° C) and cooling rapidly—as for example, by water quenching.

It can be prevented by cooling the metal in the original annealing cycle very rapidly from a temperature of about 1200° F (649° C). Your attention is directed to the possibility of the existence of patents relating to heat treatment to correct embrittlement, and we suggest you look into that phase.

Casting Liners Centrifugally

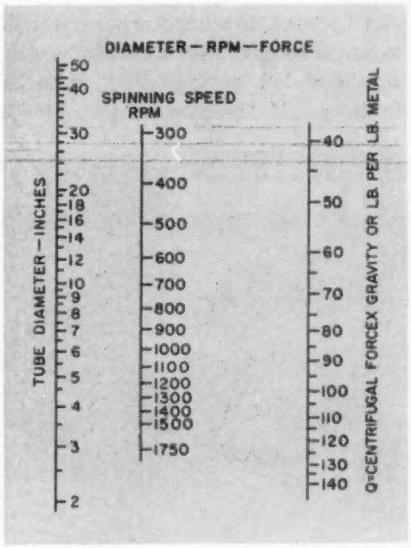
QUESTION Can you furnish us with information regarding the manufacturing procedure for centrifugal castings? We mainly are interested in sleeve stock for cylinder and pump liners made of gray iron. Also give us the names and addresses of companies which manufacture machinery for producing this line.

ANSWER Due to the numerous details involved, we can only touch on the general features of the centrifugal process for production of gray iron sleeves or liners. They may be made in sand-lined or in metal molds. In the latter the castings tend to chill and require annealing unless the composition is adjusted carefully to provide a gray structure under the conditions involved. Coating the mold surface with graphitizing agents prior to admission of the metal and/or use of insulating refractory coatings also will alleviate the chilling tendency.

In making liners the molds usually are spun or rotated on the horizontal axis, and the speed of rotation will depend upon the bore diameter—speed decreasing with increase of diameter. According to Donoho, *Transactions*, AFS, 1944, a centrifugal force of 75g serves satisfactorily for sand-lined molds, while a force of 60g operates well for metal molds in the "true" centrifugal process.

To eliminate the necessity of calculation, Donoho developed the accompanying nomograph to determine the speed of rotation when the centrifugal force and bore diameter are known. In this the intersection of a straight line connecting the selected centrifugal force and bore diameter with the central line indicating spinning speed, gives the revolutions per minute for the mold. If large flanges are involved, the speed will have to be reduced to avoid excessive force at the periphery of the large diameter.

To obtain the desired thickness the front and back of the mold are closed with rings—dry sand cores in the case of sand-lined molds, while metal rings are employed with metal molds. Additionally a definite quantity of metal is poured into the mold. This may be accomplished by weighing the metal or by using a ladle or pouring cup or funnel of definite volume. Generally a finish allowance for machining of 3/16 to ¼-in., inside and



Nomograph permits easy determination of the spinning speed

out, is provided, but on larger sizes of tubes the allowance may run to ⅜ or ½-in. Exact amount to be allowed for finish inside and outside, of course, will have to be determined experimentally.

While a number of articles have been published on centrifugal casting, they do not specifically deal with the work you are interested in. However, the basic principles are the same. A series of three articles by Hall, entitled "Centrifugal Casting of Steel" in the August, September and October, 1948 issues of FOUNDRY, discusses in considerable detail various features of centrifugal casting. Names and addresses of centrifugal casting equipment manufacturers may be found in the advertising section of FOUNDRY.

Wants To Make Crucible Steel

QUESTION We have an oil-fired crucible furnace on which we have perfected a burner which readily melts cast iron, and we would like some information on melting steel in this furnace in crucibles from No. 60 to 125. We want to make small steel castings up to 100-200 lb, and would like a formula for soft steel castings such as gears and other small parts.

ANSWER While you mention you have an efficient oil burner which melts cast iron readily, you will find that melting steel and getting it sufficiently high in temperature to pour into sound castings is another story with plenty of headaches.

You will require silica sands bonded with bentonite since sands used in iron molding are not suitable for steel—and you should have a suitable furnace for annealing or heat treatment of the steel castings as well as a laboratory to determine whether the steel analysis is satisfactory for the application or service involved. Moreover, graphite pots or crucibles, unless lined with about ¼-in. of refractory clay, are not suitable except for high-carbon steel since the molten material will absorb carbon from the pot. Clay crucibles, of course, eliminate that trouble.

Presumably your reference to "soft" steel means medium-carbon since that is the most commonly used type and contains about 0.30 C, 0.60 Mn, 0.80 Si max., 0.06 S max., and 0.05 P max. To obtain such a composition, especially with respect to the maximums on P and S, it will be necessary to know the composition of your raw material so adjustments may be made to come within the limits. For example, boiler plate may have the following range: 0.15 to 0.35 C, 0.60 to 0.80 Mn, 0.035 to 0.05 P, 0.04 to 0.05 S, and 0.15 to 0.20 Si.

Possibly you may be able to melt such material and have the P and S within bounds, but due to melting loss and possible pickup of S from the fuel, the P and S tend to increase. Hence, unless you can obtain scrap with P and S on the low side, it will be necessary to include some "washed metal" in the charge to make sure that those

(*Concluded on page* 128)

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(*Concluded from page* 126)
elements in the final steel are not over the maximums. Washed metal contains around 3.75 C, 0.025 P and S, 0.15 Mn and Si.

Crucible steel is deoxidized with ferrosilicon and ferromanganese added about 5 minutes or so before the pot is pulled for pouring. Since the silicon content of the steel castings can run up to 0.80 maximum, you safely can add about 10 oz of 50 per cent ferrosilicon to 100 lb which would give about 0.50 Si in the castings, However, you should know the Mn loss, if any, during melting in order to determine how much ferromanganese can be added.

Metal Recovery From Turnings

QUESTION We would like some information on how to use our bronze borings and turnings that have been returned to the foundry from the machine shop. All our melting is done in a coke-fired cupola and we have tried to remelt these bronze returns without much luck. Our heats run around 1200 to 1600 lb, but if we use too much of the borings it will get by the melting area into the metal and chill it. Is there any material that we can use to make these returns into pigs or so that they will be usable? We have a furnace for melting our iron, and have the cupola for the bronze.

ANSWER Your inquiry relative to melting brass and bronze in the cupola strikes us as rather odd since that type of melting unit generally is employed only for tonnage work—say 2 to 3 tons per hr. You do not mention how much borings you are trying to melt, but you should not have difficulty with around 30 per cent. Complete boring charges cause trouble because they "blanket" the bed, thereby reducing the melting rate as well as the temperature of the melting zone.

Possibly your trouble may arise from not having the lining below the tuyeres well preheated before charging. Recommended practice is to start about 2 hr before with wood and coke, using only natural draft. About ½-hr before charging, build up the bed to 32-36 in. and turn on the wind so that the coke is burned all the way through. Blast pressure should be low—probably not over 4 oz.

Another procedure would be to take your iron melting furnace—by that we are assuming it is a reverberatory type—and melt down a heel of fairly heavy scrap. Then gradually add the borings and turnings to the molten bath, working them under the surface so that they dissolve as rapidly as possible.

To make the job a little easier, it might be possible to place a good-sized refractory tile through the furnace door or roof so that one end is under the surface of the molten bath, and the other outside the furnace. Borings are pushed through the tube with a plunger about the same size as the diameter of the tile. Instead of a tile you might use a piece of iron or steel pipe well coated inside and out with refractory cement on that portion which dips into the molten bath.

Solder Will Not Tin Casting

QUESTION We make plumbing goods and about every six months or so we receive complaints that yellow brass ferrules in one particular melt will not tin or take solder. The solder will not stick and the ferrules turn a dark brown. Various foundrymen have told us that since we melt only scrap yellow brass to produce the ferrules, that perhaps we occasionally get too much chrome or nickel into the melt. For cost reasons we cannot use ingot metal. The ferrule has a ground or machined surface for approximately 1 in. on one end to enable solder to adhere to the ferrule. Do you think it is the chrome and nickel from plated scrap that is causing the trouble? Would metal poured at high temperature affect the tinning quality?

ANSWER While we cannot give a definite answer on the source of tinning difficulty, several possibilities appear. You mention that the ferrules have a ground or machined portion at one end, and it might be that the user did not remove the thin film of oil which might have been present. Other possible causes, as you indicate, are the presence of some elements which prevent wetting by the tinning operation.

So far as we can ascertain nickel and chromium plated objects can be "tinned" and soldered without trouble using commonly employed zinc chloride-hydrochloric acid fluid; hence, the fact that the brass may contain those elements should not cause trouble. However, aluminum and silicon additions result in oxide coatings which must be removed and kept from reforming during the tinning operation. For example, in the case of aluminum bronze a decidedly acid flux composed of equal parts of hydrochloric acid and zinc chloride (25 per cent in water) is recommended. Parts, of course, must be washed thoroughly after soldering to prevent corrosion.

One way to determine whether or not aluminum and silicon may be the cause would be to melt small batches with deliberate additions of those elements, and try tinning the resulting cast specimens. The same could be done with nickel and chromium plated scrap.

Strainer Core High in Binder

QUESTION We are using in our foundry strainer cores made of silica sand, bentonite and linseed oil which are baked between 480 and 660° F. We find that at the end of pouring when the core is covered on both sides with molten metal, it starts to bubble and throw metal out on the surface of the mold. Resultant castings are good. Cores burn with a luminous flame. Will you advise us on precautions to be taken on the ingredients of the core mix and baking temperature? Also is use of such oil-sand cores conventional practice in American foundries?

ANSWER Your reference to the strainer cores causing bubbling or boiling of the metal in the sprue after completion of pouring indicates that an excessive amount of gas is being generated, and the logical remedy would be to reduce the amount of core oil in the mix.

You do not mention what your present ratio of sand to oil is, but it should not be less than 40 to 1, and preferably higher in the interest of economy. We suggest that you experiment with oil reduction until you strike the least amount which will provide a satisfactory product.

While many foundries still use oil-sand strainer cores which they make in their own corerooms, there is a definite trend to increased use of ceramic type strainer cores which are available in a variety of sizes from several manufacturers.

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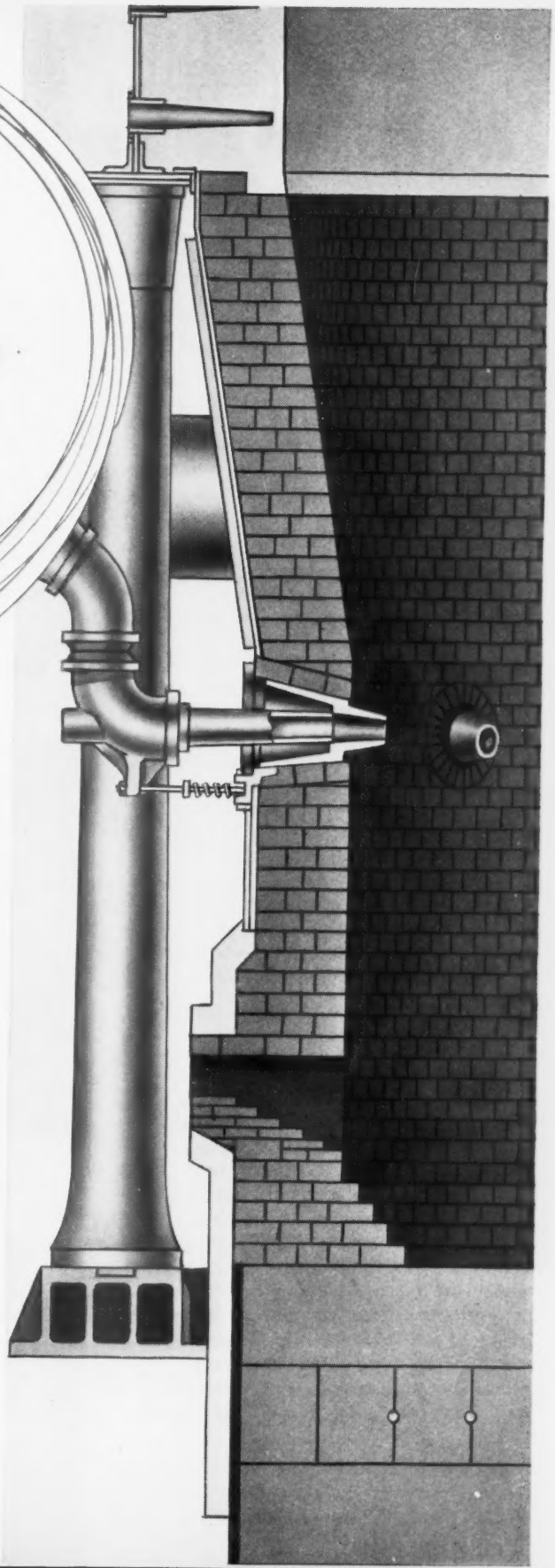

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Men of Industry

JACK GOUDZWAARD was recently appointed chief metallurgist, Brillion Iron Works Inc., Brillion, Wis. Following graduation from Michigan College of Mining and Technology in 1947, Mr. Goudzwaard joined Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., where he worked in the quality control and sales departments and as melting supervisor.

♦ ♦ ♦

Robert A. Lubker, formerly associate manager of the metals department, Armour Research Foundation, Illinois Institute of Technology, Chicago, has been appointed manager of the metals research department, succeeding **Dr. Max Hansen** who has resigned. Mr. Lubker was graduated from University of Washington in 1942 and for 4 years was associated with Westinghouse Electric Corp., East Pittsburgh, Pa., as a nonferrous metallurgist. After receiving his master's degree in metallurgical engineering from Carnegie Institute of Technology in 1946, he joined Armour Research Foundation as supervisor of nonferrous metals research.

♦ ♦ ♦

John Nieman has been appointed sales engineer, Shell Process Inc., Chicopee, Mass., to handle sales of the company's equipment in Illinois, Indiana, Michigan and Wisconsin. Mr. Nieman attended Illinois Institute of Technology and until recently was a superintendent of the foundry division, Caterpillar Tractor Co., Peoria, Ill. **H. W. Kellogg** has been named sales engineer for the company in Ohio, Pennsylvania and New Jersey. Mr. Kellogg was formerly metropolitan New York sales engineer, Durez Plastics & Chemicals Inc., Tonawanda, N. Y.

♦ ♦ ♦

Richard L. Lich, for two years assistant engineer at the Commonwealth plant of General Steel Castings Corp., Granite City, Ill., has been named assistant to the vice president in charge of engineering. **Paul A. Foster,** since 1951 general foreman of the cleaning and finishing department, has become superintendent of the department, succeeding **L. L. Spengler. William H. Rapp,** who since 1951 has been inspection foreman at the Commonwealth plant, has been appointed chief inspector at the Eddystone, Pa., plant.

♦ ♦ ♦

Charles W. Pearson has retired as general manager of the Buflovak Equipment Division, Buffalo, but will continue on the board of directors of the parent company, Blaw-Knox Co., Pittsburgh, and serve as consultant to the management. Mr. Pearson joined the Buffalo Foundry & Machine Co. in 1905 and, when the company merged with Blaw-Knox in 1945, became a vice president and director and continued as general manager. **James P. Beyser,** since 1948 works manager of Buflovak, has succeeded Mr. Pearson as general manager. He joined the division in 1926. **L. J. Wischerath,** with Buflovak since 1923, and formerly assistant to Mr. Pearson, has been named a vice president of the division.

♦ ♦ ♦

Fred B. Riggan, who recently established a foundry consulting service in St. Louis, has accepted a commission with the S. G. Yulke Co., Stevanger, Norway, where he will be located for 6 months.

♦ ♦ ♦

C. D. Tucker has been named production superintendent of the Bay City (Mich.) Division, Dow Chemical Co., Midland, Mich., responsible for the magnesium foundry, magnesium fabrication and machine shop. A graduate of State University of Iowa, Mr. Tucker joined the company in 1937 and since 1952 has been

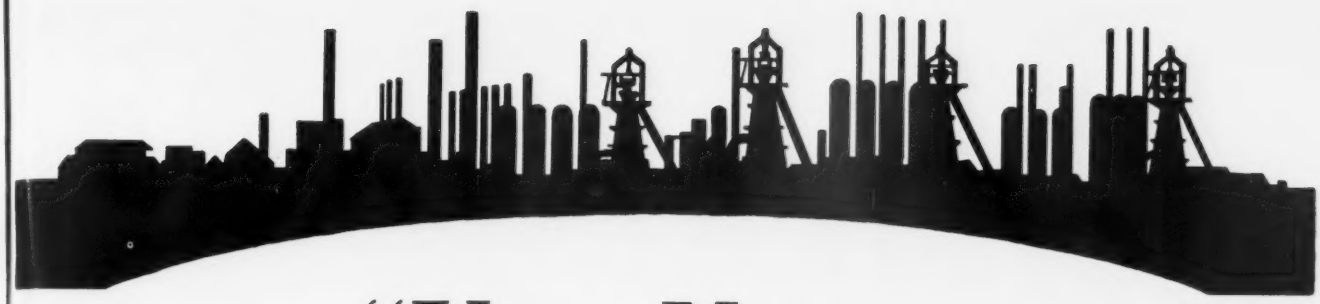
(*Continued on page* 132)

JACK GOUDZWAARD
. . . joins Brillion Iron Works

ROBERT A. LUBKER
. . . heads metals research

JOHN NIEMAN
. . . Shell Process equipment

H. W. KELLOGG
. . . Shell Process sales



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. . . joins General Smelting

ED F. DODGE
. . . materials handling agent

JACK D. EURICH
. . . joins Carl E. Rowe & Co.

O. JAY MYERS
. . . heads AFS Chapter

(*Continued from page* 130)
superintendent of the foundry at the Bay City Division.

♦ ♦ ♦

A. A. Throckmorton, since 1947 associated with Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., has been appointed sales manager, General Smelting Co., Philadelphia. Until recently Mr. Throckmorton was located in Chicago as manager of Kaiser's alloys division. Early last year he was chief of the products branch and acting deputy director, Aluminum and Magnesium Division, NPA, Washington.

♦ ♦ ♦

A. J. Van Harn, formerly of Flint, Mich., has been named executive assistant to the president, Grindle Corp., Markham, Ill., where he will be in charge of sales and advertising for the company's engineering service, air purification and fuel equipment. In sales and advertising work for 12 years, recently Mr. Van Harn has been engaged in selling industrial products and construction service in the midwestern states.

Ed F. Dodge of Ed F. Dodge & Associates, Detroit, has been named eastern Michigan materials handling agent for the Union Metal Mfg. Co., Canton, O. Mr. Dodge's agency, with offices in Birmingham, Detroit, Oxford and Metamora, Mich., will continue to represent Union Metal Mfg. Co. in the Detroit area.

♦ ♦ ♦

Ray H. Sutter, president, has acquired the entire stock of Sutter Products Co., Dearborn, Mich., and **Percy L. Sutter,** vice president, has resigned. **Russell F. LaBeau,** who joined the company in 1950 as vice president and chief engineer, has been appointed executive vice president in charge of operations. **George Buchanan,** with the company since 1952, has been named vice president in charge of sales and sales promotion in co-operation with the company's United States sales representative, Frederic B. Stevens Inc., Detroit. Other personnel changes include: **Earl J. Blough,** chief engineer; **Oscar Bernth,** plant manager; **J. A. Martineau,** general purchasing agent; **Seymour L. Collins,** manager of material control and customer service; and **Mrs. H. M. Johnson,** office manager.

♦ ♦ ♦

Jack D. Eurich, until recently superintendent of the brass foundry, Kaydon Engineering Corp., Muskegon, Mich., has joined Carl E. Rowe & Co., Milwaukee. Mr. Eurich's previous associations include assistant metallurgist, Lakey Foundry & Machine Co.; metallurgist, Centrifugal Foundry Co., both of Muskegon; and Muskegon Piston Ring Co., Sparta, Mich.

♦ ♦ ♦

O. Jay Myers, currently serving as chairman of the Twin City Chapter of the American Foundrymen's Society, is technical director of the Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, at its central research laboratory in Minneapolis. Mr. Myers was graduated from Princeton University and Colorado School of Mines. In 1945 he became associated with Archer-

(*Continued on page* 134)

A. J. VAN HARN
. . . Grindle Corp. sales

RAY H. SUTTER
. . . Sutter Products head

RUSSELL F. LaBEAU
. . . Sutter exec. v. pres.

GEORGE BUCHANAN
. . . sales promotion, Sutter

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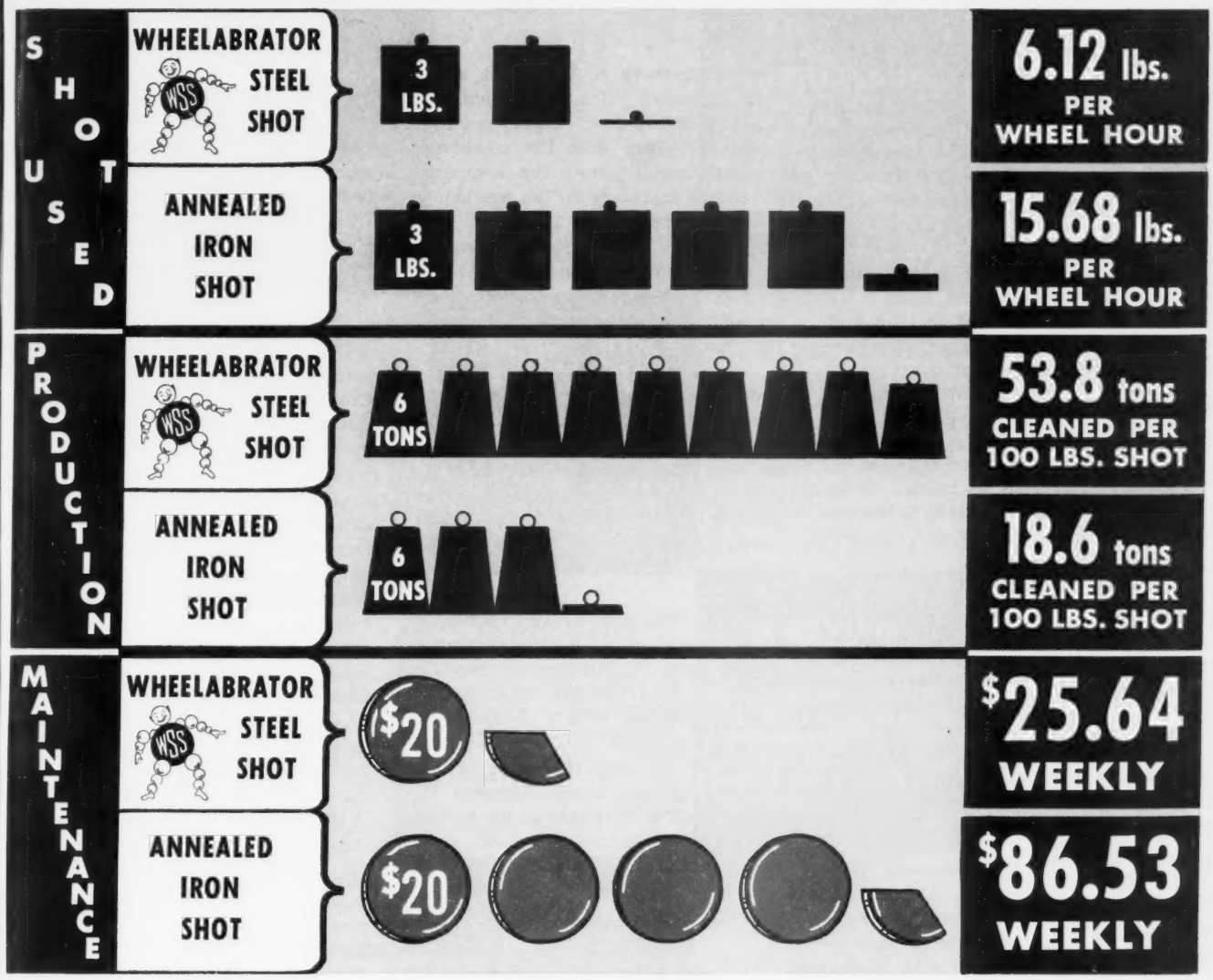

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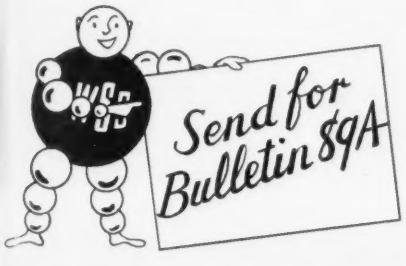


American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Ind.

(*Continued from page* 132)

Daniels-Midland Co., and was director of foundry research until 1952 when he was named technical director. He was vice chairman of the Twin City Chapter last year.

♦ ♦ ♦

William H. Redhead has joined the Kindt-Collins Co., Cleveland, as sales engineer. He will represent the company in sale of products for the pattern industry in parts of Ohio, Indiana, Michigan and West Virginia. Mr. Redhead joined the Lake City Malleable Co., Cleveland, in 1939, and served as office manager and purchasing agent of the company's Ashtabula, O., defense plant during its construction. Recently he had been director of purchases at the Cleveland plant and a member of the management committee, as well as acting general manager of the Columbus Malleable Iron Co. division, Columbus, O.

♦ ♦ ♦

George R. Forbes Jr. has joined the New York sales staff of L. B. Foster Co., Pittsburgh, rails, steel sheet piling, pipe, etc. Mr. Forbes attended Lehigh University and was graduated from Pace College. He was formerly assistant general manager, John R. Forbes Foundry & Iron Works, Jersey City, N. J.

♦ ♦ ♦

Anthony Haswell, president, Dayton Malleable Iron Co., Dayton, O., has been appointed a director of the Cincinnati branch, Federal Reserve Bank of Cleveland, for a 3-year term.

♦ ♦ ♦

Russell L. King, until recently abrasive engineer in the Chicago office, Bay State Abrasive Products Co., Westboro, Mass., has been named direct representative in the Buffalo area. Mr. King joined the company in 1949, following graduation from Worcester Polytechnic Institute.

♦ ♦ ♦

Mrs. Elizabeth S. Wetherell, since 1942 president, Bradley Washfountain Co., Milwaukee, has retired following 30 years with the company. Mrs. Wetherell joined the company in 1924 as secretary to the president, became secretary in 1928 and vice president in 1941. Since becoming president she has been general sales manager. **Howard G. Mullett,** vice president, has been named president and treasurer of the company.

♦ ♦ ♦

William Adam Jr. has been elected president, Ajax Electric Co., Philadelphia, succeeding **Dr. G. H. Clamer,** who has retired from that office. Dr. Clamer will continue as president, Ajax Electro Metallurgical Corp., Ajax Electrothermic Corp., and Ajax Engineering Corp.

♦ ♦ ♦

W. M. Trigg, since 1952 manager of the materials pilot manufacturing department, Westinghouse Electric Corp., Pittsburgh, has been named manager of the metals development plant to be built in Blairsville, Pa., to house the department. As assistants to Mr. Trigg, **Leonard W. Golden** will be responsible for metals casting and manufacture of powdered metal parts, and **R. D. Rowley** will be in charge of wrought alloy manufacture.

♦ ♦ ♦

C. J. Bianowicz, formerly in charge of industrial sales, nickel alloys department, International Nickel Co., New York, has been appointed manager of the department, succeeding the late H. D. Tietz. Mr. Bianowicz joined the company in 1928 as a salesman in the department he now heads. **J. M. Weldon** has been transferred to the general sales department as assistant to the vice president where he will deal principally with mill and foundry products. With the company 26 years, Mr. Weldon has held various assignments in sales, executive and other departments. **D. W. Machon** has been named head of the cobalt section of the nickel sales department. From 1949 to 1952 he was a company representative abroad and since last year has been in the secretary's office.

♦ ♦ ♦

Charles J. Scullin has been appointed assistant to the president, Crown Pipe & Foundry Inc., Jackson, O. **Marion A. Maloney,** formerly secretary, has been named vice president in charge of personnel. Mr. Scullin re-entered the foundry consulting business in 1945 after serving several years with the Aluminum and Magnesium Division, War Production Board, Washington. He received his early foundry training with Scullin-Gallagher Steel Co., St. Louis, American Steel Foundries, Chester, Pa., Baldwin Locomotive Works, Philadelphia. Later he was manager of technical service, St. Louis Coke & Iron Co., Granite City, Ill.

♦ ♦ ♦

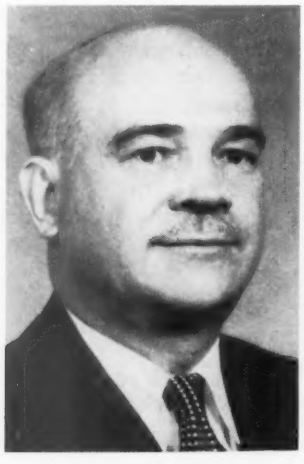
Fred F. Roehll, national sales manager, Eutectic Welding Alloys Corp., Flushing, N. Y., has been named vice president in charge of sales. Mr. Roehll was graduated from Ohio State University and joined the company in 1946. He became national sales manager in 1950.

♦ ♦ ♦

Arthur H. Kirkpatrick has been appointed special project engineer, Frederic B. Stevens Inc., Detroit, to

(*Concluded on page* 136)

RUSSELL L. KING
. . . abrasive sales, Buffalo



C. J. BIANOWICZ
. . . Inco department mgr.

FRED F. ROEHLL
. . . v. p., Eutectic Welding

ARTHUR H. KIRKPATRICK
. . . Stevens project engineer

* DIXIE BOND

The strongest bond clay ever offered American Foundrymen. Moderate dry and hot strength mean easy shake-out and better flowability.

* TRIPLACT

Additive to core and molding sand; reduces scabbing, stops veins and fins in cores, improves finish; imparts higher flowability.

WESTONITE

Versatile chemically coated sand for green sand, skin-dried or dry sand molding. Maximum production, best finish, fewer types of sand needed.

* BLACK HILLS BENTONITE

Highest quality Wyoming bentonite of controlled uniformity. High green strength, high permeability, high dry and hot strength.

REVIVO FIRE CLAY, LAWCO FIRE CLAY, BONDACT FIRE CLAY

Found only in the Lawrence seam in Southern Ohio. Uniformly high refractory value. Use Revivo Fire Clay for highest plasticity, Lawco Fire Clay for general purposes and Bondact Fire Clay for mixes for gun emplacement.

ECP products satisfy a wide range of foundry needs

CUPOLINE

Pre-mixed refractory for patching cupolas by air placement. Eliminates human equation. Produces uniform, dense patch of maximum slag resistance at lower cost.

* REVIVO

Strong, refractory, durable and economical. Unusually high colloidal content. Since 1923, the standard of comparison for refractory bond clays.

** ECP Bond Clays and many combinations give you the one right answer for every purpose.*

* BALANCED REVIVO

Extremely high dry and hot strength. Thermoplastic, gives toughness at high temperatures. Helps eliminate washing and scabbing.

DURA PRODUCTS

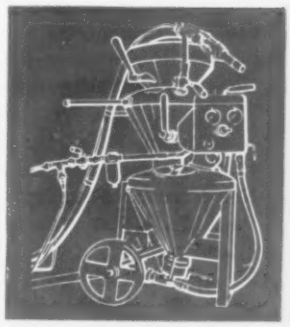
Plastic blow tubes, wear inserts and core box gaskets. Life many times that of metal. Cleaner, smoother cores, higher production, less maintenance.

* REVIVO CORE PASTE

Astonishing strength—35% to 300% stronger than competitive materials. It may be air-dried or oven-dried. Non-boiling.

BONDACTOR

For fast mechanical ramming of refractory linings and patches. Meters a dry refractory mix uniformly. Less bridging, longer heats, more tonnage, cleaner metal from Bondactor-patched cupolas. Saves hard manual labor and reduces costs. →



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EASTERN CLAY PRODUCTS *Department*

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(*Concluded from page* 134)

assist in developing new applications of automatic processing equipment. Prior to joining the company in 1946, Mr. Kirkpatrick was associated for over 9 years with Ilg Electric Ventilating Co., Chicago, as well as Lincoln Electric Co. and General Electric Co., Cleveland. He is a graduate of University of Michigan.

♦ ♦ ♦

J. R. Van Rensselaer, metal and machinery manufacturers' representative in Los Angeles, has been ap-

J. R. VAN RENSSELAER
. . . sales representative

pointed representative in southern California for Precision Castparts Corp., Portland, Oreg. **Ernest Marr,** who has been associated with Mr. Van Rensselaer since graduating from University of Southern California in 1951, will assist in sales of ferrous and nonferrous castings and shell molding service offered by Precision Castparts Corp.

♦ ♦ ♦

Dr. William A. Pearl, director, Institute of Technology, Washington State College, has been appointed Bonneville Power Administrator by the Secretary of the Interior.

♦ ♦ ♦

Boniface Miller has been named vice president-superintendent, Crown Non-Ferrous Foundry, Inc., Chester, Pa. Mr. Miller was formerly superintendent of foundries, Baldwin-Lima-Hamilton Corp., Philadelphia.

♦ ♦ ♦

Jack Bean, for the past year secretary - treasurer, Michigan Steel Casting Co., Detroit, has been appointed president and general manager. Mr. Bean joined the company in 1942 and became comptroller in 1951. **Harold W. Schroeder** has been appointed vice president-operations. Mr. Schroeder, with the company 26 years, started as a chemist and for 6 years has been works manager.

Walter Hakin, who joined the company in 1929, has been named vice president-sales. Mr. Hakin has served in design and sales engineering, and product development with the company. **Elry Christensen,** who has been with Michigan Steel 25 years, has become sales manager. He has worked in the foundry in several capacities and since 1935 in sales.

♦ ♦ ♦

J. W. Thees has been appointed acting manager of Toledo, O., plants 1 and 2, Doehler-Jarvis Division of National Lead Co., New York. **C. I. Hodgson** has succeeded Mr. Thees as works manager of Toledo plant 1. **K. F. Koegler** has been named works manager of Toledo plant 2, the position formerly held by Mr. Hodgson.

♦ ♦ ♦

J. A. Wettergreen has been appointed works manager, Bucyrus-Erie Co., South Milwaukee, Wis., succeeding **O. H. Kraft,** resigned. A graduate of University of New Hampshire, Mr. Wettergreen joined the company as a special apprentice in 1930. From 1932 to 1942 he was in the steel foundry where he became superintendent. Following 6 years with General Electric Co., Schenectady, N. Y., he returned to Bucyrus-Erie as manager of its Chicago plant and since 1950 has been plant manager in Evansville, Ind.

♦ ♦ ♦

William McWane has been re-elected chairman of the board, McWane Cast Iron Pipe Co., Birmingham, and **A. T. McWane** has been re-elected president. New officers elected at the company's annual meeting include **O. H. King,** vice president, who will continue as vice president, Pacific States Cast Iron Pipe Co., company subsidiary; **W. P. Cox,** vice president-sales; **A. W. Claussen,** vice president-operations; and **P. M. Lovell,** secretary-treasurer.

♦ ♦ ♦

Reuben W. Pelto has been appointed sales manager of the Ready-Power Division, Ready-Power Co., Detroit. Mr. Pelto has served in numerous service and sales capacities during 25 years with the company.

♦ ♦ ♦

George A. Agnew, since 1935 general superintendent, Malleable Iron Fittings Co., Branford, Conn., has been appointed assistant to the general manager in charge of special projects. Mr. Agnew joined the company 49 years ago after working as a patternmaker with Sargent & Co., New Haven, Conn. **G. R. Young,** formerly production manager, has become general superintendent. Mr. Young attended Temple University and was associated with U. S. Rubber Co., New York, prior to joining Malleable Iron Fittings Co.

♦ ♦ ♦

F. James McDonald, elected chairman of the Saginaw Valley Chapter of the American Foundrymen's Society for 1953-54, is manufacturing superintendent of the Saginaw (Mich.) Malleable Iron Plant, Central Foundry Division, General Motors Corp. Mr. McDonald entered the Saginaw plant in 1940 as a co-operative student in the General Motors Institute. Following graduation he served in the Navy, later returning to the plant where he was in the engineering sales and production control departments until last year when he became manufacturing superintendent.

F. JAMES McDONALD
. . . AFS Chapter Chairman

♦ ♦ ♦

Oliver E. Mount, secretary-treasurer, American Steel Foundries, Chicago, has retired following 37 years with the company. **Carter R. Lines** has been elected treasurer, **Orrin B. Garner** secretary, and **Lester T. Moate,** controller. **Joseph B. Lanterman,** vice president, is in charge of the finance and legal divisions of the company.

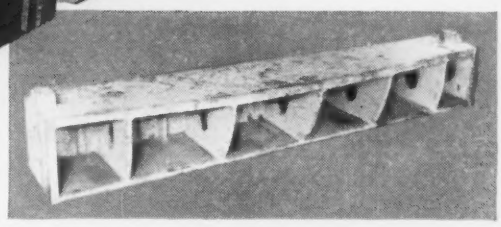
♦ ♦ ♦

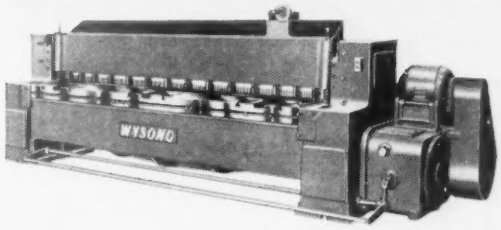
William Johansen, for 2 years general sales manager, Magnesium Co. of America, East Chicago, Ind., has been elected vice president in charge of sales.

♦ ♦ ♦

Eugene J. Schwetz, formerly project metallurgist at the Chicago works, National Malleable & Steel Castings Co., Cleveland, has been transfered to the Capitol Foundry Co., Phoenix, Ariz., subsidiary of National Malleable, where he is chief metallurgist.

One-piece, 5800 lb. table casting for the 10 ft., ¼-inch capacity shear built by Wysong & Miles Company, Greensboro, North Carolina.





Chateaugay Pig Iron

Meets Strict Casting Requirements of Wysong and Miles

● Casting requirements on all Wysong and Miles metal-working machinery are strict. Sturdy, rigid, high-tensile castings—35,000 to 40,000 p.s.i.—are particularly important on their Model 1025 Power Squaring Shear. Strength and rigidity minimize deflection, assure correct shear alignment for a clean cut on the metal.

To meet these requirements, Wysong uses Chateaugay Pig Iron in the cupola mixture. The result is high strength, uniformity and machinability throughout every casting. This is possible despite deep recesses, cored pockets and adjoining light and heavy sections. Chateaugay shrinks evenly, fills adjoining light and heavy sections completely. It produces an unusually fine and uniform grain structure and surfaces with high wear-resistance. Chateaugay castings machine easily and economically.

A Republic Pig Iron Metallurgist will be glad to give you the complete story on Chateaugay, the low-phosphorus, copper-free Pig Iron. Let us know when you would like him to call at your plant.

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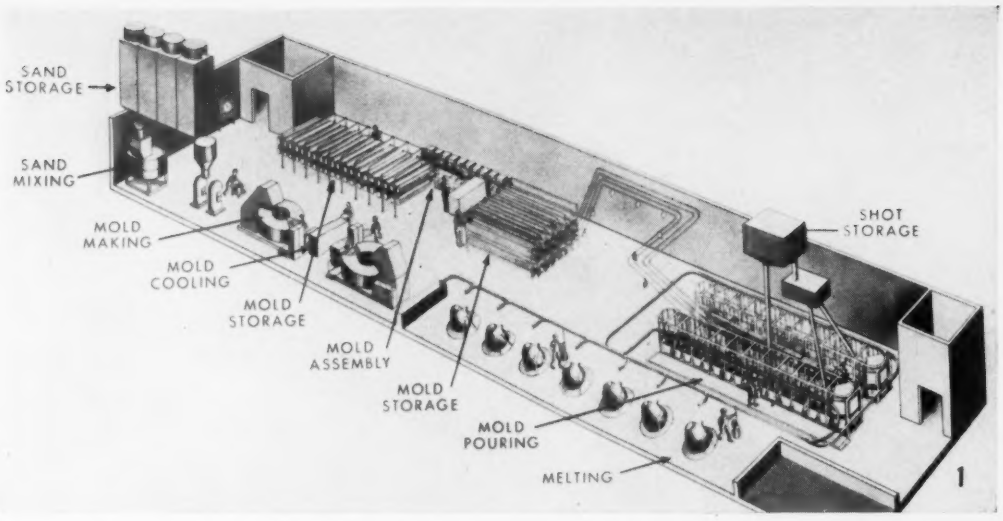
REPUBLIC PIG IRON

"CHATEAUGAY"	REPUBLIC	REPUBLIC
Low-Phosphorous, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL



Drawing of the new foundry shows arrangement of production equipment

HIGHLY MECHANIZED FOUNDRY

Developed Around New Shell Molding Machine

GEARED to produce 240 molds per hour, a new automatic shell molding machine is the basic production element in a highly mechanized shell mold foundry recently put into operation by Walworth Co., Boston. Converted from a green sand, bronze foundry operation, the new foundry is adapted to mass production of valves, threaded pipe fittings, pipe flanges and other products cast in bronze, brass, carbon steel, stainless steel, aluminum and other alloys.

The new shell molding machine used in the foundry was designed and developed by Walworth and is being produced by Link-Belt Co., Chicago. The machine will be marketed by Walworth to the foundry industry.

Equipment and processes in Walworth's shell mold foundry include sand and resin mixers, the molding machine, mold assembly, melting and pouring equipment integrated by conveyor systems as shown in Fig. 1. Small mixers (Fig. 2) blend phenolic resins with a wetting agent, and the resulting blend then is mixed with sand in a larger mixer. The automatic eight-station rotary mold-making machine (Figs. 3 and 4) accommodates eight patterns at a time and produces a complete shell mold every 15 seconds. Three stations preheat the pattern, three cure the mold, one contains machinery for pouring the resin-sand mixture on the pattern, and, at the final station (Fig. 4), the completed shell is ejected automatically. Pattern plates measure 16 x 28 in. and form both halves of a 14 x 16-in. complete shell mold.

Shells are broken in half, cores placed in the mold cavities and the halves placed in a Walworth-developed mold-closing machine. Adhesive is applied to the edges of one shell and the mating shell positioned over it. The closing machine automatically applies uniform pressure over the entire mold, insuring complete joining (Fig. 5).

Completed molds can be sent by conveyor to automatic storage racks, where they can be stored almost in-

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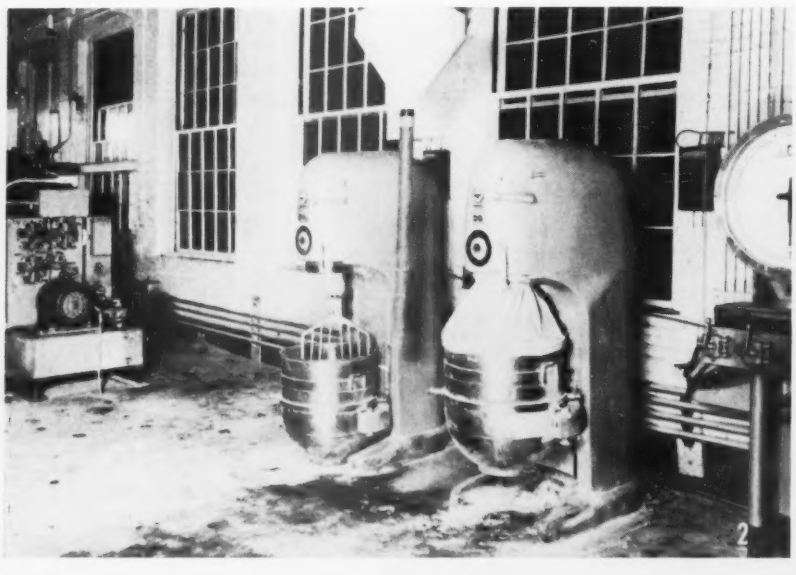

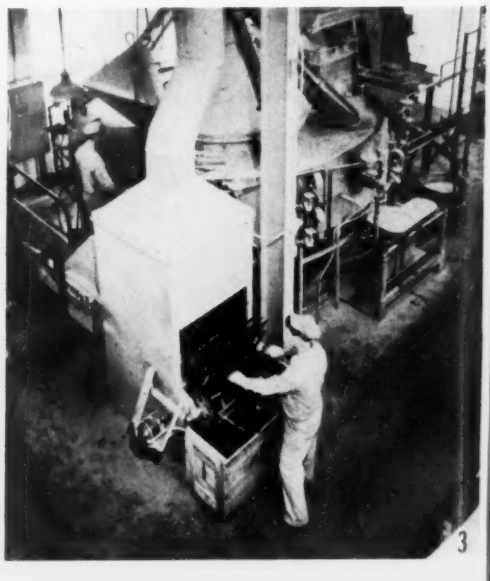

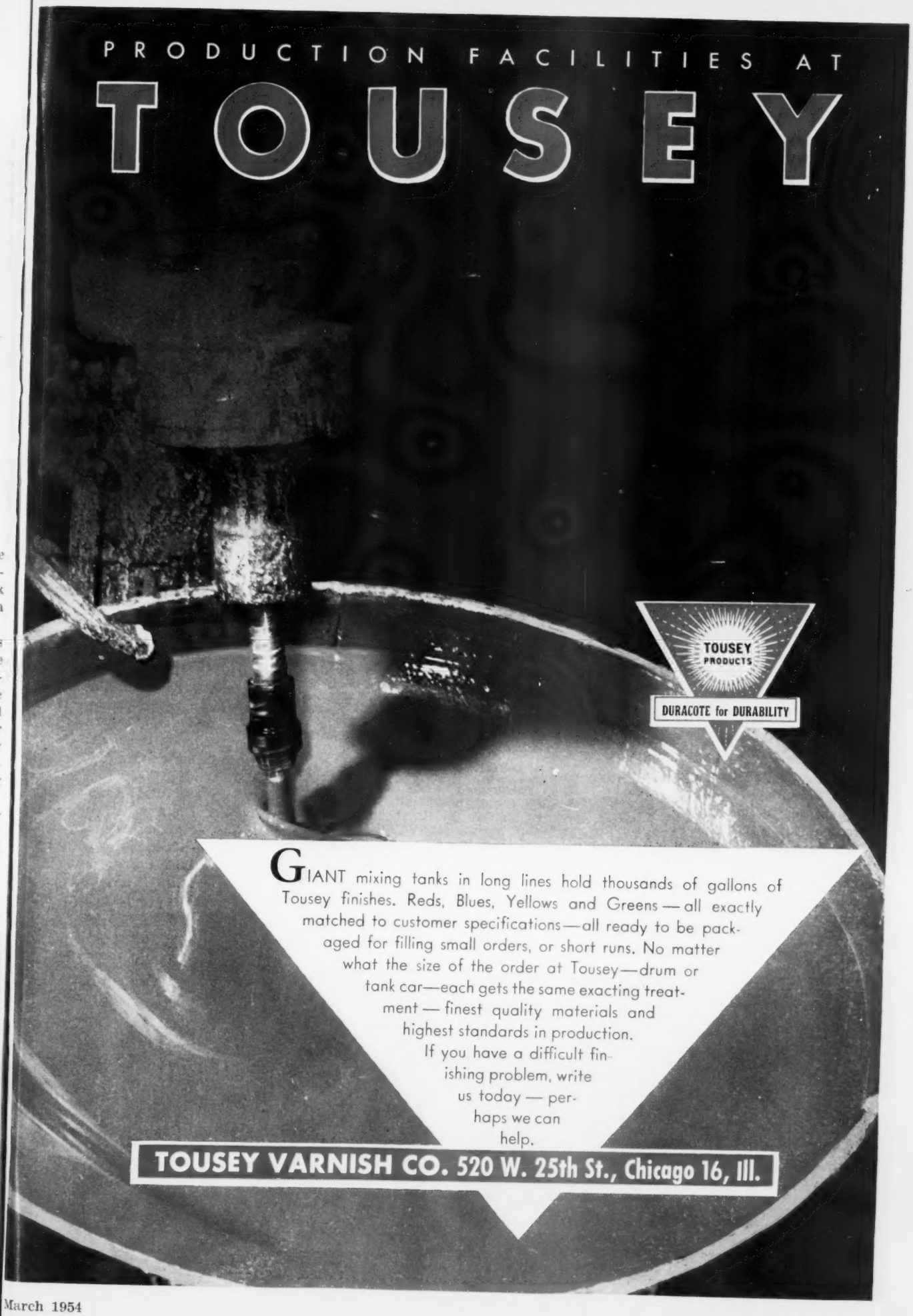
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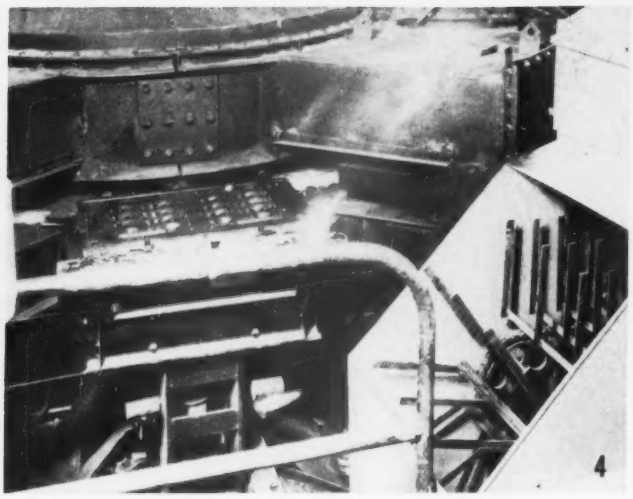

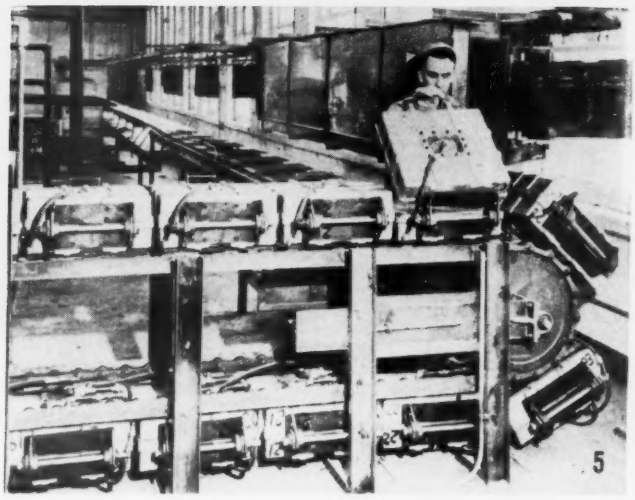

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definitely, or directly to the shell backing machine. This unit (Fig. 6) consists of a series of drop-bottom steel boxes suspended from an overhead, continuous loop monorail conveyor which travels at the rate of 6 ft per minute. Two assembled molds are placed in each box. An automatic device pours steel shot around the molds to support them against internal pressure developed during pouring. Overhead monorail-carried ladles of 200-lb capacity are used to transport metal from the furnaces and to pour the molds, each ladle handling an average of 12 to 16 molds (Fig. 7).

After the pouring operation, the boxes arrive at an automatic dumping station where the bottom gates are opened to release castings, molds and shot to a chute in the floor. Shot is recycled for further use and castings and molds transferred automatically to a cooling conveyor. A shakeout separates most of the mold from the casting.

Photos and descriptive matter are by courtesy of the Bakelite Co., Division of Union Carbide & Carbon Corp., New York. Walworth uses Bakelite resins and Linde Air Products Co. silicone release agent.

Publishes Pocket Booklet On Human Relations

A 64-page, paper-bound, pocket size booklet, *A Short Course in Human Relations,* is intended to provide supervisors and foremen with a ready reference guide on human relations problems. It is written by F. C. Minaker, who is industrial relations editor, *American Business.*

Published by Dartnell Corp., 4660 Ravenswood Ave., Chicago 40, it is available at 40 cents per copy.

Book Review

Die Formsande und Formstoffe (Molding Sand and Molding Materials), 2nd Edition, by Karl Schiel and elaborated by Robert Willy Muller, cloth, 251 pages, 6 x 8½ in., published by Wilhelm Knapp Verlag, Halle, Germany. Price 7.80 D.M.

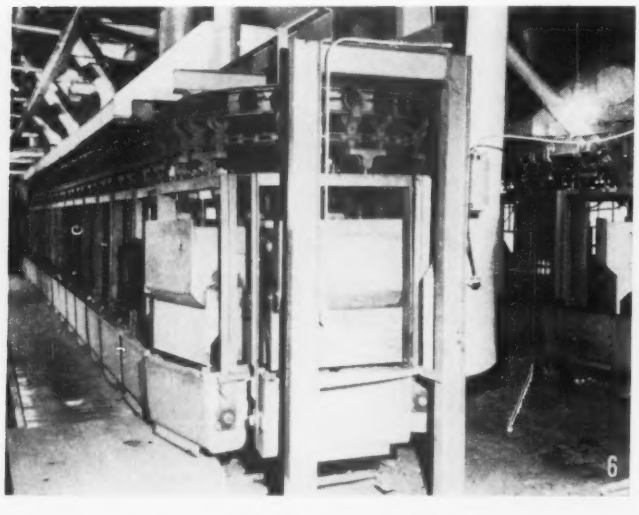
This is an enlarged and up-to-date edition of Mr. Schiel's book, first published in 1933 and here amplified and modernized by Mr. Muller.

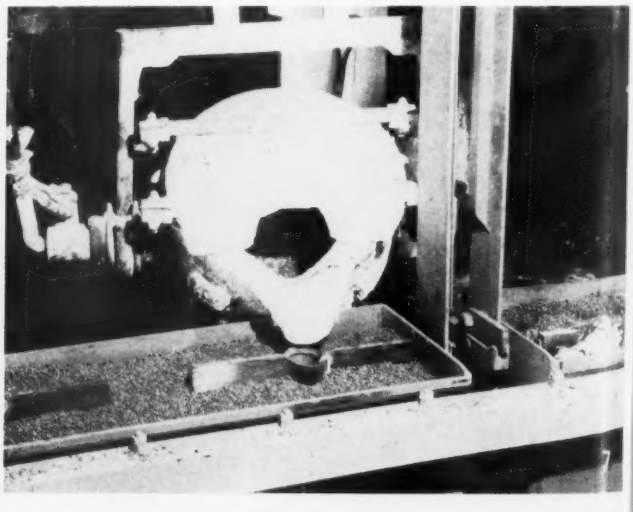
The title, *Molding Sand and Molding Materials,* clearly indicates the nature of the contents, and the book offers a rather comprehensive look at sand that ranges from data on its nature and structure to its use in specific types of foundries.

Offers New Magazine to Engineering Students

Senior and graduate students working toward degrees in the engineering sciences now have a business magazine of their own, *Industrial Science and Engineering.* The first issue of the new publication is the January, 1954, number. It is published monthly by Industrial Laboratories Publishing Co., 201 North Wells St., Chicago 6.

Qualified students, deans of engineering and chairmen of engineering science departments in appropriate recognized educational institutions may obtain the magazine by writing to the publisher. It is available to other persons by subscription only, at the rate of $25 per year.





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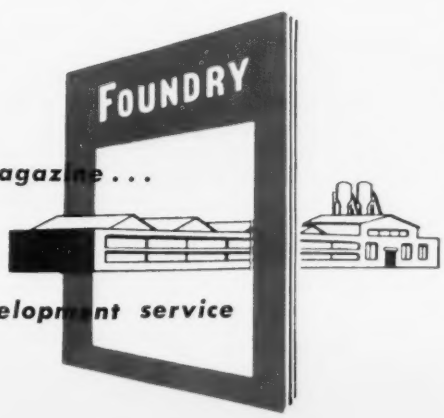

More than a magazine . . .

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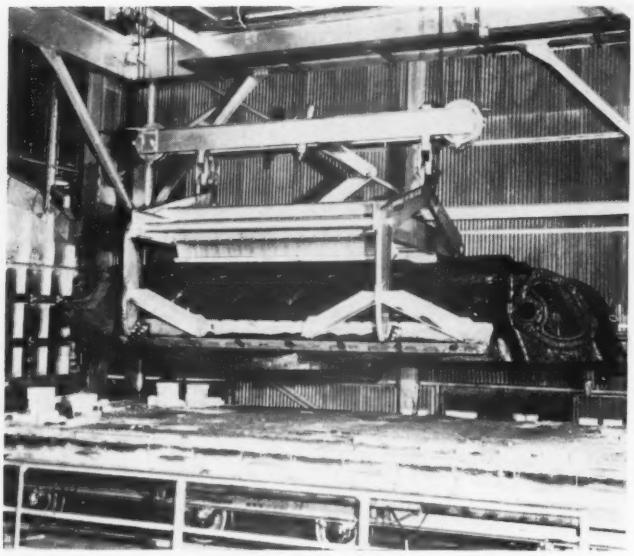
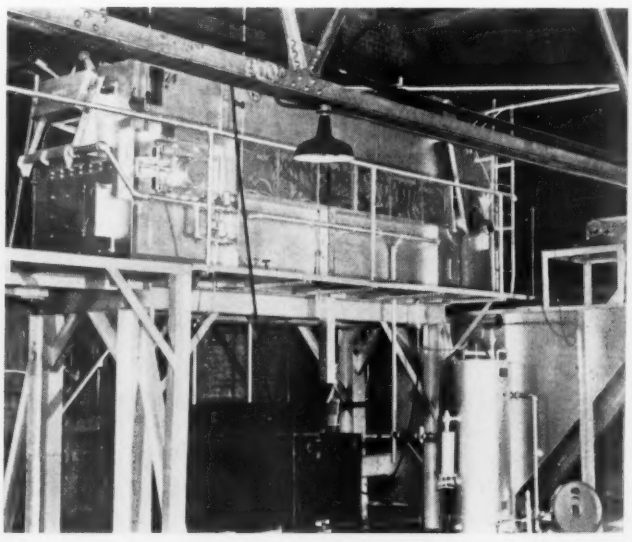
News Views



TANK TONGS: Cast steel hulls for Army tanks are lifted quickly and safely by automatic tongs especially designed for General Steel Castings Corp., Granite City, Ill., by Heppenstall Co., Pittsburgh. Used in conjunction with other special equipment, the tongs make possible remotely controlled handling of heating for hardening, tempering and requenching, saving time and reducing hazards to workers. Their capacity is 40,000 lb

CONCENTRATED RESEARCH: Speaking to 100 representatives of his company and to 150 civic and business leaders of Cambridge, O., William C. Keeley, president, Vanadium Corp. of America, describes how research activities of the firm are being concentrated in a new center at Cambridge. The first unit opened Dec. 1 and provides 30,000 sq ft of metallurgical and chemical laboratories. A second unit, scheduled for early completion, will contain pilot plant facilities for actual production tests

AS TIME GOES BY: Thomas W. Pangborn, left, president, Pangborn Corp., Hagerstown, Md., welcomes C. A. Bultman, the firm's Detroit district manager, to the Pangborn Quarter Century Club at its third annual dinner, held recently. Mr. Bultman and 13 other new members with 25 years of service were presented engraved gold watches. A group of 39 Pangborn employees with 10 years of service also attended the dinner, as the guests of the club



HARDENING ON HIGH: Faced with the problem of positioning a Lindberg electric conveyor atmosphere hardening furnace, Auto Specialties Mfg. Co., St. Joseph, Mich., placed the 17,400-lb furnace on an inexpensive scaffold that could be dismantled quickly if necessary. A lift truck hoists containers holding the work to be treated to the loading platform. After treatment, work drops from the conveyor belt into the quench tank, from which a flight conveyor drops it into a steel chute that leads to tempering baskets. Soil conditions precluded floor mounting of the unit. In addition, mobility was desired to permit repositioning the furnace if necessary

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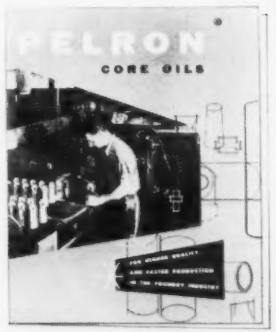

Get your copy of the new Pelron Core Oil story. Here is an informative, interesting booklet describing Pelron's service to the Foundry Industry. You will see how Pelron goes about producing a core oil that is custom-made for any casting operation, to make it better, faster and more economical. Just send in this coupon for your copy of this new bulletin. Pelron Corporation, 7740 W. 47th Street, Lyons, Illinois.

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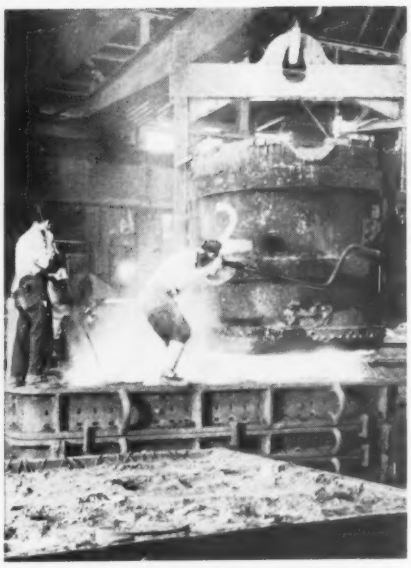
CITY_____ STATE_____



Pouring metal into a sand mold

Casting Tank Parts

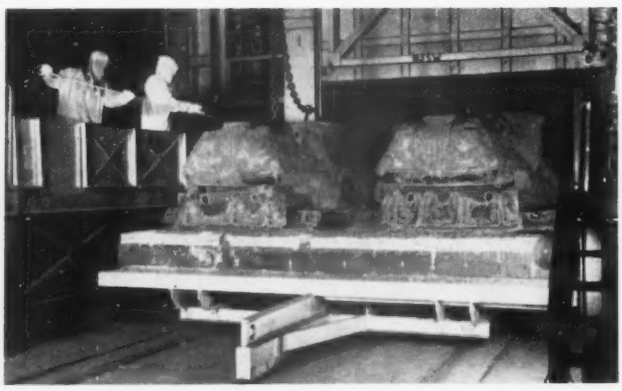
BLAW-KNOX Co.'s Union Steel Casting Division, located in the Lawrenceville section of Pittsburgh, is continuing to make castings for the Army's new medium tank, the Patton 48. It is supplying Fisher Body, the prime contractor, with the turret and the gun mount shield.

Until Fisher Body was selected as the only source for the M48 tank, Union Steel Casting also supplied these castings to the Ford Motor Co. Recently the division completed orders for castings for the M47 medium tank. It furnished Chrysler Corp. and American Locomotive Co. the turret and the rear hull.

Founded in 1899 as the Union Steel Casting Co., this unit became part of Blaw-Knox in 1929. During World War I Union Steel Casting supplied to the Navy ingots that were used in making Navy guns. During World War II the Union Steel Casting Division made castings for medium tanks, castings for British tanks, Navy gun shields, and parts for the Navy range finder. It was one of the first firms to win the coveted Army-Navy E.

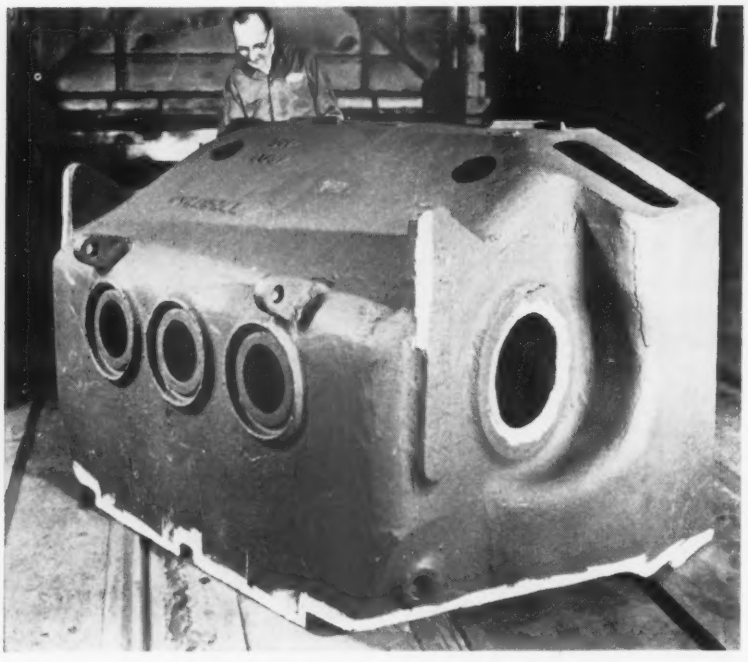
In making the castings for the M47 and M48, many steps are involved, some of which are shown in the accompanying illustrations. Metal for pouring the castings is obtained from

(*Concluded on page* 147)

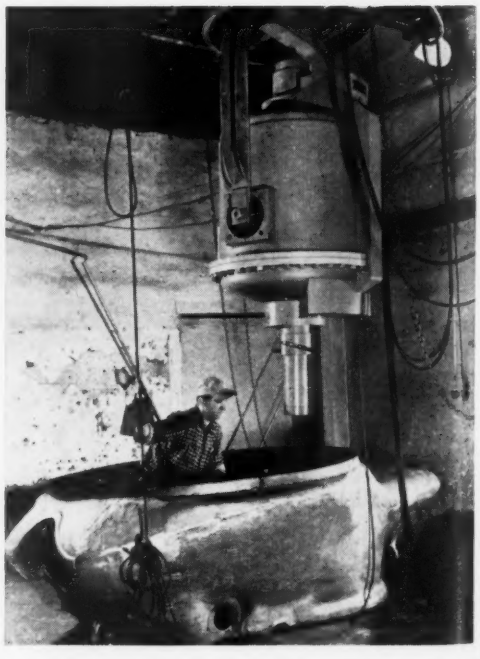


Tank turrets are removed from heat treating furnace

Exterior fixtures being welded on a turret casting

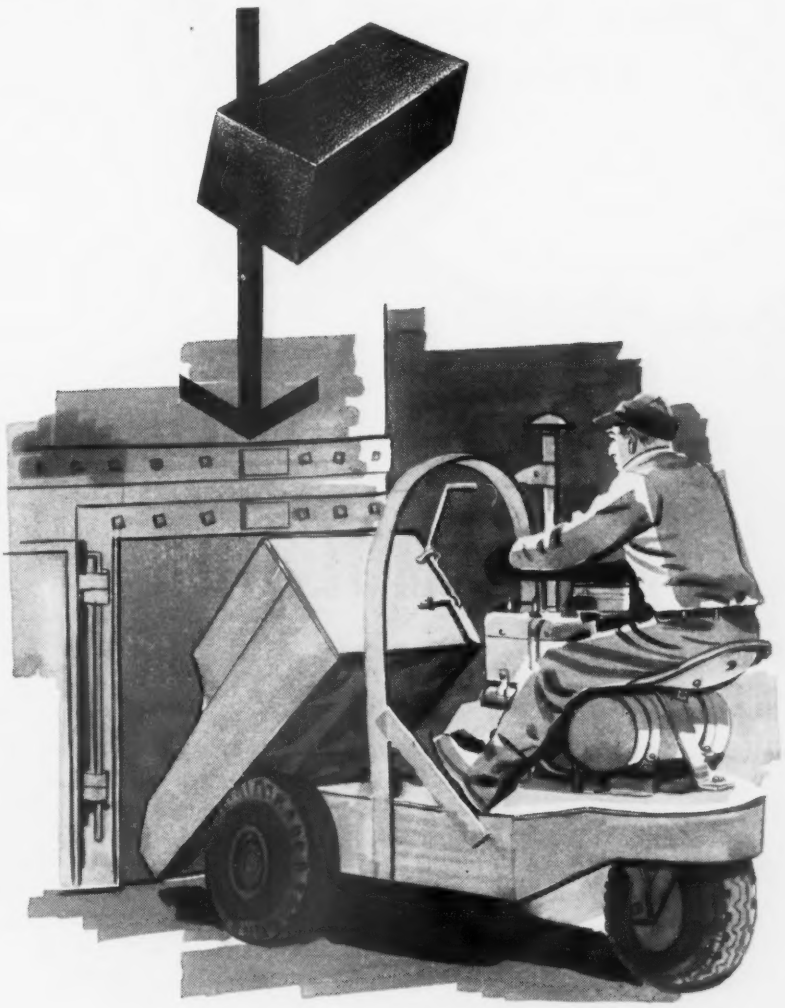


Bottom rear hull section of an M47 tank is being inspected



Adjusting a 1-million-volt x-ray tester

the same results at lower cost with— MEXITE®



Mexite briquettes, composed of 70% graphitic carbon, provide foundrymen with a positive method of raising and stabilizing the carbon content of cupola charges and at the same time reduce the cost. Larger amounts of scrap can be used with resultant savings in charging costs. For example, if 400 lbs. additional scrap is charged, four Mexite briquettes will retain the same carbon analysis at a savings of $3.06* per ton of charge.

Mexite briquettes help produce better castings because they permit accurate carbon control. Mexite helps assure lower chill and hardness, and provides better fluidity and machinability thus increasing useable metal yield and cutting scrap loss. Mexite briquettes are packed 90 lbs. to a carton for easy handling and storing. We'd like to show you what Mexite can do in your foundry . . . write us today for a specific recommendation made for your particular area. We'll also send along our newest bulletin that will show you how Mexite can help keep your costs down where you want them to be.

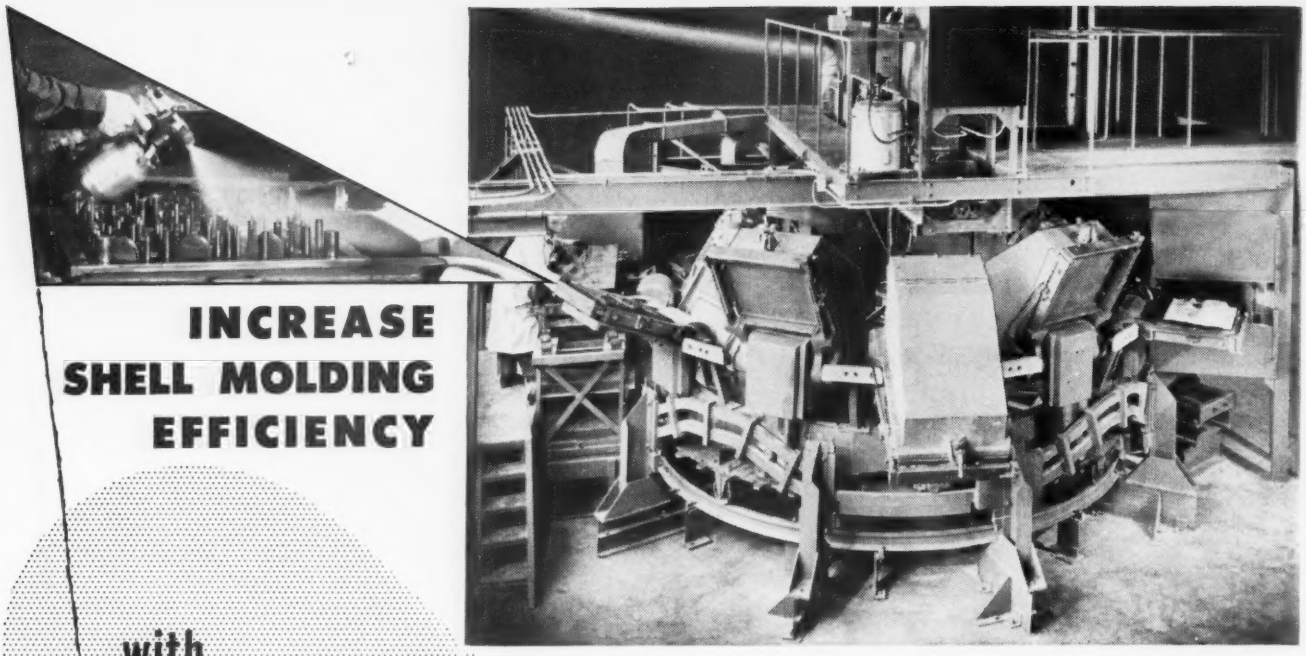
Based on average current pig iron and scrap prices

OUR 100th YEAR

188

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN



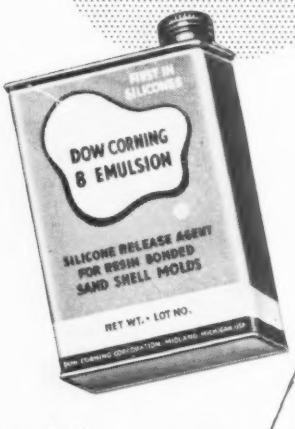
INCREASE SHELL MOLDING EFFICIENCY

with

DOW CORNING 8 EMULSION

Automatic from sand-resin blending to the finished molds, the 12-station shell mold machine developed and built by Mechanical Handling Systems, Inc., of Detroit, is capable of producing 480 shells per hour. Only a single operator is required. The machine rotates counterclockwise through pattern spraying, sand-resin application, curing, and finished shell delivery. An automatic proportioning system for sand, resin and wetting agent is located at the top of the machine.

. . . the Silicone Parting Agent that gives you clean, positive release of shell molds and cores at lowest cost



The more use you make of the shell process, the more continuous your production of clean, accurate shells must be. That's why leaders in this new field specify Dow Corning 8 Emulsion as their parting agent. Equally effective in manual or automatic equipment, this non-corrosive, nonflammable silicone emulsion assures peak production every working day.

That's because Dow Corning 8 Emulsion provides easy release at molding temperatures and will not break down to form a carbonaceous deposit on pattern plates. Nonsticking and nongumming, it keeps patterns cleaner longer and cuts your maintenance costs to the minimum.

Easily diluted in hard or soft water, Dow Corning 8 Emulsion is available at a price some 8% below that of earlier silicone emulsions. It is highly resistant to creaming in storage or after dilution. For lower costs, longer service and positive release, specify Dow Corning 8 Emulsion. Try it yourself at our expense. Send for your FREE trial sample today.

Send for sample TODAY

DOW CORNING CORPORATION, Dept. AH-15
Midland, Mich.

Please send me
- ☐ Free sample of Dow Corning 8 Emulsion
- ☐ Data on Silicone Release Agents for the Shell Process

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MIDLAND MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D.C. (Silver Spring, Md.)

Canada: Dow Corning Silicones Ltd., Toronto Great Britain: Midland Silicones Ltd., London France: Cie. St. Gobain, Paris

(*Concluded from page* 144)

acid open hearth furnaces. After the casting cools, it is removed from the sand, the sand cleaned off, and the risers burned off.

Following heat treatment, a specified number of units are x-ray tested with a 1-million-volt unit. Next the castings are cleaned and welded before a final tempering, which is followed by machining.

After these operations at the Union Steel Casting Division, the castings are shipped to the Blaw-Knox Equipment Division, where the exterior fixtures are welded on and the castings painted before shipment.

Both the M47 and the M48 have been developed since the start of the Korean war. The M47 tank weighs approximately 48 tons and carries a crew of five. The M48, known as the Patton M48, is in the 45-50 ton class. The Patton 48 carries a crew of four.

When the Korean war broke out in 1950, the Army called a series of conferences to study the tank picture. On July 17, 1950, a new tank, now termed the M47, was ordered directly into production, even though no complete design drawings of the vehicle existed. In so doing the Army completely by-passed the usual mock-up, pilot model, and engineering and service board test and field test stages, jumping directly to the tooling-up phase. The first M47's started rolling off the line in May 1951, ten months after the idea to produce such a tank was conceived. The hull of the M47 is more heavily armored and its gun is of higher velocity than any previous medium tank.

"Remember, Hubert, it's just until we get our regular shot blaster repaired!"

The M48 is now in production. It will be sent to tactical units in this country and overseas. The Patton has a 90-millimeter high-velocity gun, two 50-caliber and one 30-caliber machine guns. Its new design gives it a low silhouette, elliptical turret, and stronger and wider tracks.

Both the M47 and M48 have precision rangefinders, which quickly calculate the distance to a target and give the tank gunner an opportunity to fire before the enemy can calculate his position. Both have 810 horsepower, Ordnance-Continental V-12 air-cooled engines, and Allison cross drive transmission, which gives them more maneuverability than any known enemy tank.

Meetings of Interest to Foundrymen

Mar. 4-5—American Society for Metals, technical program and beryllium conference, midwinter meeting, Statler Hotel, Boston

Mar. 10-11—Foundry Educational Foundation, annual conference of advisory committees and annual meeting, Hotel Cleveland, Cleveland

Mar. 15-19—National Association of Corrosion Engineers, tenth annual conference and exhibition, Kansas City, Mo.

Mar. 16-17—Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

Mar. 19-20—East Coast Regional Foundry Conference, cosponsored by Metropolitan, Philadelphia and Chesapeake Chapters of the AFS, with Chesapeake as host, at Philadelphia

Apr. 5-7—American Institute of Mining & Metallurgical Engineers, national open hearth conference, Palmer House, Chicago

Apr. 8-9—Malleable Founders' Society, market development conference, Carnegie Institute of Technology, Pittsburgh

Apr. 14-16—Society for Experimental Stress Analysis, spring meeting, Netherland Plaza Hotel, Cincinnati

May 3-5—Air Pollution Control Association, annual meeting, Patten Hotel, Chattanooga

May 4-7—American Welding Society, national spring technical meeting, Hotel Statler, Buffalo

May 5-7—American Society of Training Directors, annual conference, Hotel Schroeder, Milwaukee

May 5-7—American Welding Society, welding and allied industry exposition, Buffalo Memorial Auditorium, Buffalo

May 8-14—American Foundrymen's Society, annual convention and exhibition, Public Auditorium, Cleveland

May 16-19—Industrial Furnace Manufacturers Association, spring meeting, the Homestead, Hot Springs, Va.

May 17-20—Basic Materials Exposition, International Amphitheater, Chicago

June 9-11—American Society for Quality Control, annual convention and exhibit, Hotel Jefferson, St. Louis

June 14-15—Malleable Founders' Society, annual meeting, Seigniory Club, Province of Quebec, Canada

June 14-18—American Society for Testing Materials, annual meeting, Hotels Sherman and Morrison, Chicago

Sept. 13-20—Instrument Society of America, International Instrument Congress and Exposition, Convention Hall and Commercial Museum, Philadelphia

Sept. 27-28—Steel Founders' Society of America, fall meeting, the Greenbrier, White Sulphur Springs, W. Va.

Oct. 6-8—National Foundry Association, 56th annual meeting, La Salle Hotel, Chicago

Oct. 14-16—Foundry Equipment Manufacturers' Association, annual meeting, the Greenbrier, White Sulphur Springs, W. Va.

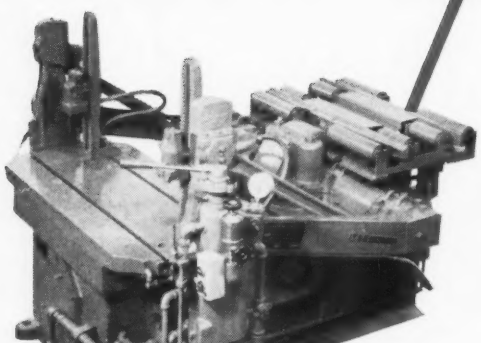
Oct. 27-29—Grinding Wheel Institute & Abrasive Grain Association, fall meeting, Edgewater Beach Hotel, Chicago

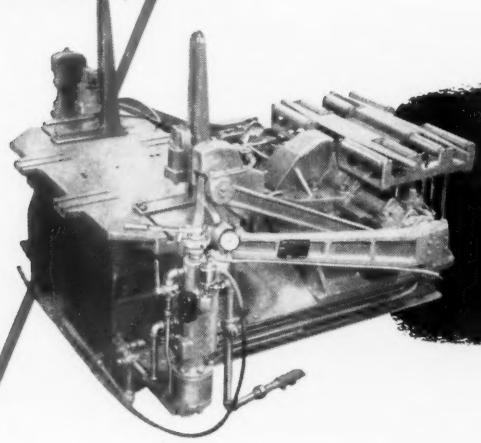
Nov. 1-5—American Society for Metals, National Metal Congress and Exposition, International Amphitheater, Chicago

Nov. 11-12—Gray Iron Founders' Society, annual meeting, the Homestead, Hot Springs, Va.

Dec. 1-4—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh

Another HERMA





Here is one unit in the complete line of HERMAN Molding Machines, in all types and sizes, to fit all foundry operations.

Here are t
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HERMAN MOLDING MACHINES

t work

IN these Herman Molding Machines the rollover and draw operations are hydraulically controlled, utilizing the principle of air on oil.

No pit type foundation is required. They are flexible, fast, simple machines to operate.

One rotary type valve controls all operations. They are shipped completely assembled.

Any size mold or core can be clamped quickly by pneumatic clamps.

The finished mold or core is deposited directly on the discharge conveyor.

These machines can be equipped with an electric timer to govern the period of jolting.

These Herman machines, like all other machines in the complete line, are rugged and dependable under a wide variety of foundry operating conditions.

Hermans are made in all sizes, all types. Send for information today.

re t rsatile HERMAN 750 lb. and 1500 lb.

spe t rollover capacity machines

ES R WAY BY THE WAY THEY'RE MADE

MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Mr. R. J. Oboth says:

"We are getting excellent production from our Herman Molding Machines at Urick. We use two of their 750# series Jolt Rollover and Draw Machines.

Our flasks are 24" wide and 24" long. Cope mold is 10" deep; drag is 10" deep.

We produce a variety of miscellaneous castings weighing from 8 pounds each to a single casting weighing 400 pounds. Patterns are changed as much as 10 times per day.

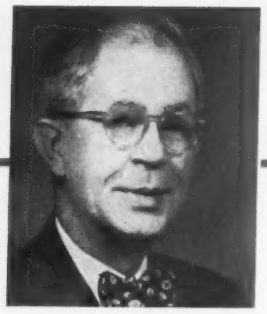
Our daily production from this pair of Herman Jolt Rollover and Draw Machines, on a 7½ hour operating shift, is 350 complete molds.

We are completely satisfied with the performance of these machines."

Urick Foundry Company
15th and Cherry Streets
Erie, Pa.

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.



Man-to-Man

By RALPH L. LEE

Lee Hobby Foundry News

"Being in the know makes a fellow feel he belongs, and nothing else will make him put his best foot forward more than that"

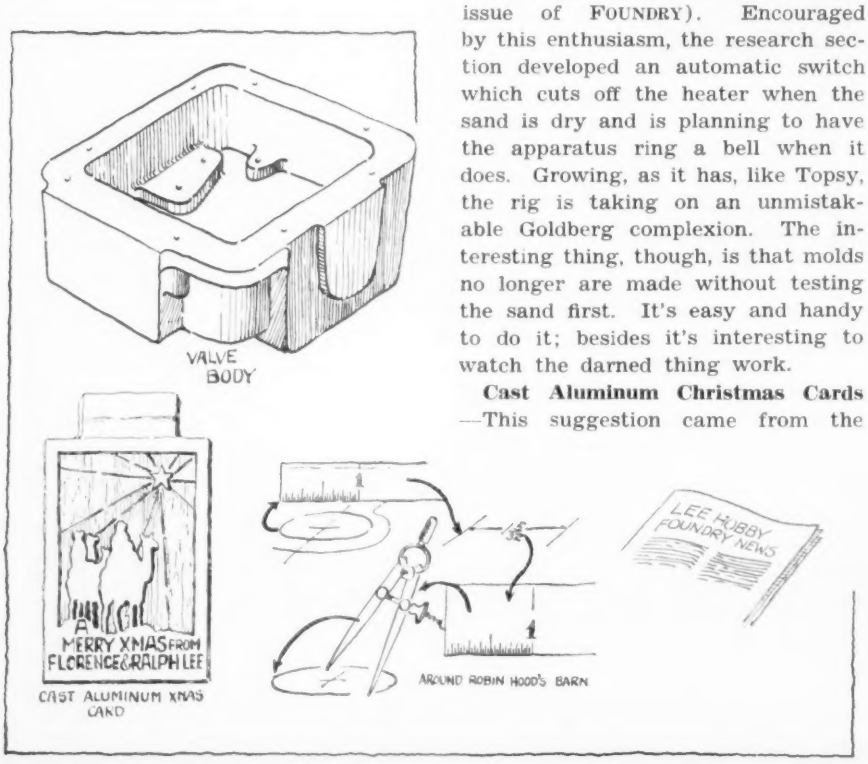
FROM the number of house organs and company newspapers being published nowadays there doesn't seem to be much doubt left as to the value of keeping employees posted on the activities of their firms and fellows.

Some of these publications apparently have blossomed from mimeographed news bulletins for internal consumption to become works of art and color for national distribution. And I imagine it's a good thing to let the general public, particularly that part of it which buys from us, or might, or which is in a position to help or hinder the cause, see what buddies we are in one great big family.

As I discussed this turn of events with Mother (that's Mrs. Lee, my home superintendent, vice president in charge and now chairman of the board), she suggested that the Lee Hobby Foundry might be missing a bet by not having a news bulletin for its employees, with perhaps a limited outside circulation. It seemed to me that she had a point there; so we decided to take sort of an experimental flier along these lines in the MAN-TO-MAN column, killing two birds with one stone, so to speak. So away we go.

Sand Moisture Tester—The head of our sand system reports that he'd hardly know how to get along now without our combination sand scales and electric drier mounted on the wall within arm's reach of the sand heap (Described in the July, 1953, issue of FOUNDRY). Encouraged by this enthusiasm, the research section developed an automatic switch which cuts off the heater when the sand is dry and is planning to have the apparatus ring a bell when it does. Growing, as it has, like Topsy, the rig is taking on an unmistakable Goldberg complexion. The interesting thing, though, is that molds no longer are made without testing the sand first. It's easy and handy to do it; besides it's interesting to watch the darned thing work.

Cast Aluminum Christmas Cards—This suggestion came from the shakeout man, along with a very attractive design which was enthusiastically accepted by the entire organization. The management would have liked to send a greeting to all of our readers, but, boy, what a production! We compromised on a mailing list of 42.



"Production Planning" pointed out that in view of the limited production, the most economical program would be to make one master pattern and use it to sweat ahead on forty molds, but the head of the pattern shop would have none of this plan. He had a stunt in mind that he wanted to try. Here's what he did:

Pantograph Attachment for the Drill Press—By the way, some time back, with full approval of management, the head of the pattern shop designed and built (we were a little slack at the time) a small pantograph arrangement that can be hooked up with our drill press in less than five minutes. The cutters have a ⅛-in. shank. There are two ratios, 2 to 1 and 3 to 1. It's swell for lettering and does a lovely job on small contour work. It can't handle aluminum or brass, though, because it isn't sturdy enough. Some day we'll remedy this situation.

The master pattern for the Xmas card was engraved from a 2 to 1 sketch on mahogany 5/32-in. thick, the relief being routed out 3/64. With the cutter sharp, the outline was easy to follow, and the results looked pretty doggoned professional. Six production patterns to be gated together for one flaskful were decided upon.

Tearing a page from the book of the ornamental bronze casters of tablets and statuary, we molded the six production patterns with a facing of very fine sand (practically French) and molasses water (3 water to 1 molasses) and dried the face of each mold with an infra-red lamp bulb, held down very close for about five minutes.

Maybe we're getting to be fanatics

(*Concluded on page* 152)

One-ton dust pan

FLORIDA Machine and Foundry Company makes its "PAYLOADER" tractor-shovel pay dividends on many material-handling jobs. One of the most interesting is the removal of rotor blast dust from the collecting hopper. The "PAYLOADER" drives under the hopper, the gate is opened and a ton of dust flows quickly into the "PAYLOADER" bucket through a canvas boot — without muss or dust-raising, as you can see.

This foundry, like hundreds of others, uses its "PAYLOADER" for many sand-handling jobs — scooping, carrying, spreading, and to do all sorts of lifting, loading and hauling jobs both inside and outside. Multiple speeds in reverse, as well as forward — plus short-turning ability — enable them to handle easily and work fast in close, awkward places.

It will pay you to find out how modern "PAYLOADERS" can improve your output and simplify your material-handling problems. The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Illinois.

Bentonite and other bagged materials are quickly carried from boxcar and stacked. Hydraulic power gives precise bucket control.

JOB STUDIES are available, illustrating and describing operations in several different plants. These helpful, authorized studies can be secured on request, without obligation.

YOU CAN'T COMPETE IF YOUR EQUIPMENT IS OBSOLETE

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

(*Continued from page* 150)

here at the LHF, but it's getting so that we shudder at the thought of cutting a gate or a runner when it's so easy to make patterns for them and to ram them up with the job. (Yes! even for two molds and sometimes one.) Because of this fanaticism we have accumulated a whole box full of assorted gate, riser, shrink-bob and runner patterns. Our castings seem to feed better, and we have a whole lot less dirt. Saves time, too.

The duplicate pattern castings came out surprisingly sharp, with the grain of the mahogany showing. Being amateurs, we feel that this ornamental casting practice, with its precise detail, has a place in multiple pattern duplication. Right or wrong, we're going ahead on that basis.

Our Xmas card production castings all came out swell (practically all), still showing ear marks of the mahogany grain—and, by the way, the grain was *not* sand-blasted on the master. In spite of the castings being only 1/16 in. through the relief section, we had no misruns or cold shuts, and they all shook out shiny. The head of our melting department is going to be awarded the leather medal, with suitable ceremony, for this outstanding performance.

Aluminum a Tricky Metal—Hearing of these plans, our melter chuckled over having read an account of the nonferrous melting roundtable at the Chicago convention, where one of the members said, "I think aluminum is a tricky metal, but you watch every guy that starts up a foundry in a chicken coop or somewhere like that, and he starts pouring aluminum."

Well, of course, aluminum melts easily, but it doesn't hold much heat. It cools off pretty fast. We've found that 50 degrees straddling 1350° makes all the difference in the world. Those Xmas cards looked as though they had been buffed. (It's the truth!)

Relined the Nonferrous Furnace—Did it right this time. We've always been in such a hurry that we didn't let a new lining dry slowly enough and long enough. This time we let it dry for two whole days before we put the heat on. It looks now as though it had been fired in a potter's kiln. Made three stools for the crucibles out of the lining material, too. We also worked out a little formula for estimating the amount of dry stuff to mix for a given lining. This is pretty important when you have to let the mix temper for 24 hours before you use it. The furnace is certainly percolating.

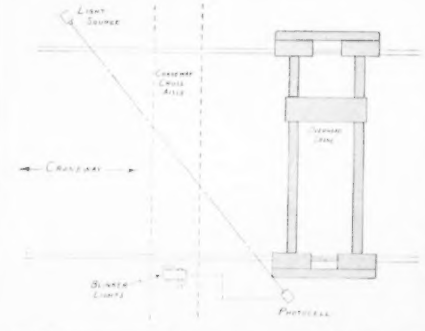
Detailed Pattern Drawings—We're building a new pressure valve for the diaphragm molding machine, and the casting for the body is quite tricky, at least for us. We pulled a little stunt that shouldn't be talked about too openly in the presence of master patternmakers, for in a way it's kind of sneaky. Instead of laying out the pattern from dimensions taken from the drawing of the part, we made a to-scale drawing of the pattern, including shrink, and then, blushing to the roots, we traced the outline of the pattern parts through carbon paper directly onto the wood. It was just a little pattern, although it had 18 pieces to it.

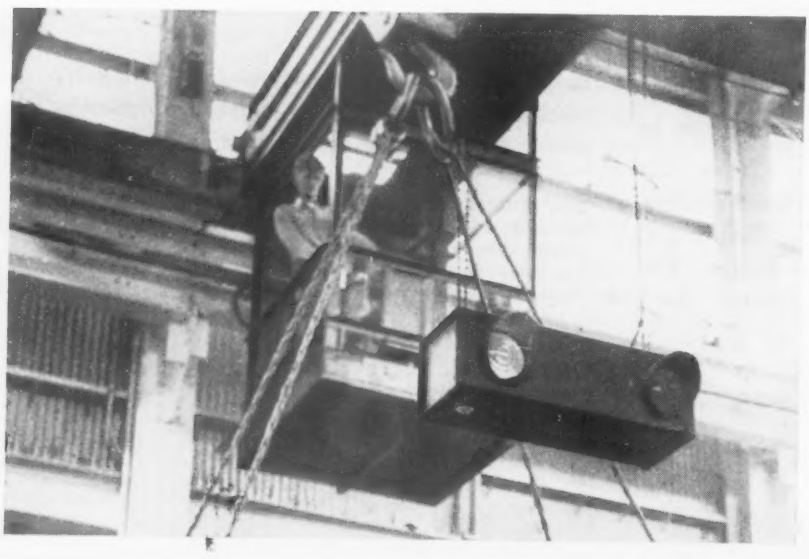
We certainly do not want to contribute to the professional delinquency of the noble patternmaking craft, but that pattern went together in shorter time and with less fuss and fewer mistakes than any other we had ever made. It's all machined now, with no mistakes or regrets showing.

I guess there's much to be said for accurate templets or some single master to refer all of the components to. With the draftsman measuring the outline of parts or the working points of the original layout, putting down the dimensions he reads from his scale in the nearest fraction and then with the patternmaker reading the figures, finding his place on his scale, transferring that place through dividers or scriber to lines on the wood to be cut and then cutting approximately to the line—well, even at its best it's a long way around Robin Hood's barn. When you get right down to it, it's amazing how close we do come.

Since we're running out of space and time, we'd better call a halt to this LHF news experiment. There's just one thing, though—whether our foundries are big enough for a company newspaper or not—, it's a darned good thing to keep everybody in the place posted on "whither we are drifting." After all, there aren't many top secrets which are too rich for the blood of the rank and file—and it's amazing sometimes to find where good ideas really originate.

In any event, being in the know makes a fellow feel he belongs, and there isn't anything that will cause a person to put his best foot forward more than the knowledge of being a part of the outfit and being trusted.





HOMEMADE LIFE INSURANCE: When loaded cranes near cross aisles at the Standard Pressed Steel Co. plant in Jenkintown, Pa., blinking red traffic lights like this one warn plant employees to keep their eyes open and their heads low. The lights are flashed on automatically by photoelectric eyes whenever overhead cranes come within 20 ft of an aisle. The unit is homemade

"Mister... here's proof!"

Figures don't lie! Cost reports prove the efficiency and economy of any product. That's why you'll see METAL BLAST abrasives being used in so many foundries. Cost reports show that both ANNEALSHOT (chilled) and SUPER-ANNEALSHOT (malleableized) do an outstanding job of cleaning castings . . . *and* hold cleaning costs to a minimum.

METAL BLAST abrasives are made of highest quality materials—formed and heat treated in the most modern equipment—come to you at prices equal to or lower than any other abrasives in the market. If it's proof of their efficiency and economy you want — order a trial supply and find out for yourself. **METAL BLAST, Inc.,** 872 East 67th St., Cleveland 3, Ohio.

METAL BLAST ANNEALSHOT
chilled shot and grit

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the persuasive abrasive

Whether your concern is castings, forgings or met
parts, make 20th Century *Normalized shot and g
a part of your straight-line production operatio

The high uniformity and greater durability of 20
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Write for our new catalog No. 1153 today.

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*One of the world's largest producers of quality shot. g
and powder—Hard Iron—Malleable (*Normalized)—Cut W
—Cast Steel (Realsteel)*

*Copyrighted trade name

Foundry Statistics

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1951	1,085,241	656,076	.....
1952			
Nov.	76,099	46,708	167,842
11 mo.	845,440	522,987	.....
Dec.	80,680	50,485	173,494
Total	926,120	573,472	.....
1953			
Jan.	87,249	53,272	174,809
Feb.	86,515	51,963	175,088
Mar.	94,481	57,025	177,776
Apr.	95,923	57,757	174,514
May	82,050	48,011	160,387
June	86,514	50,819	151,016
July	77,111	45,413	137,251
Aug.	73,855	45,415	120,801
Sept.	74,333	45,466	114,523
Oct.	73,473	45,515	104,046
Nov.	63,435	37,500	93,156
11 mo.	894,939	538,156	.....

Aluminum

(Shipments of castings—1000 pounds[2])

	Shipments				Unfilled Orders[3]
	Total	Sand	Perm. Mold	Die	
1951	515,131	193,378	160,011	151,465	.....
1952[3]					
Nov.	46,483	15,419	13,463	17,372	138,461
11 mo.	465,636	177,339	130,692	150,125	.....
Dec.	53,343	17,277	16,191	19,608	146,499
Total	518,979	194,616	146,883	169,732	.....
1953[3]					
Jan.	55,629	19,158	16,147	20,052	142,542
Feb.	54,864	17,583	16,698	20,272	148,557
Mar.	59,423	18,989	17,865	22,255	145,749
Apr.	61,582	20,009	18,583	22,620	141,231
May	57,602	19,600	16,479	21,208	138,037
June	56,820	19,330	15,535	21,675	136,437
July	51,653	16,664	15,733	18,915	126,426
Aug.	50,900	16,007	16,294	18,200	127,896
Sept.	53,694	17,818	17,215	18,245	122,049
Oct.	55,438	17,212	16,983	20,893	116,744
Nov.	51,405	16,209	15,349	19,409	108,698
11 mo.	609,010	198,579	182,881	223,744	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1951	1,197,443	1,075,437	69,883	.....
1952[3]				
Nov.	80,439	72,281	5,011	82,393
11 mo.	919,111	829,085	58,150	.....
Dec.	90,799	81,777	5,715	76,871
Total	1,009,910	910,862	63,865	.....
1953[3]				
Jan.	85,781	76,686	5,388	80,793
Feb.	85,183	76,847	5,061	76,578
Mar.	92,798	83,639	5,716	69,490
Apr.	94,362	85,471	5,462	72,291
May	85,223	76,912	4,855	66,926
June	84,656	76,333	4,706	64,535
July	71,041	64,451	3,926	61,209
Aug.	78,357	70,567	4,890	63,419
Sept.	80,307	71,895	5,273	59,141
Oct.	83,661	74,221	5,775	53,867
Nov.	74,712	66,300	5,077	49,481
11 mo.	916,081	823,312	56,129	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1951	30,825	28,090	.....
1952[3]			
Nov.	2,959	2,785	17,053
11 mo.	31,747	30,105	.....
Dec.	3,110	2,872	16,020
Total	34,857	32,977	.....
1953[3]			
Jan.	3,073	2,825	15,680
Feb.	3,225	3,033	14,834
Mar.	3,362	3,093	13,608
Apr.	3,294	3,046	12,709
May	2,679	2,434	13,635
June	3,136	2,666	13,664
July	2,372	2,084	13,840
Aug.	2,559	2,279	13,125
Sept.	2,524	2,236	12,454
Oct.	3,015	2,708	11,477
Nov.	2,677	2,413	10,619
11 mo.	31,916	28,817	.....

Foundry Production Workers

Estimated Number

(Thousands)

	Nov. 1953	Oct. 1953	Nov. 1952
Ferrous	196,600	201,400	225,600
Nonferrous	74,100	74,800	79,800

Average Weekly Earnings

Gray Iron	$73.47	$74.03	$74.09
Malleable Iron	72.01	74.10	77.07
Steel	76.24	75.83	81.17
Nonferrous	79.00	81.00	81.99

Average Weekly Hours

Gray Iron	39.5	39.8	41.0
Malleable Iron	37.9	39.0	40.8
Steel	38.7	38.3	42.1
Nonferrous	39.5	40.5	42.2

Labor Turnover Rate (Nov.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	2.5	4.0	1.2	2.4
Malleable Iron	1.9	3.8	1.4	1.9
Steel	1.2	5.2	0.9	3.8
Nonferrous	3.0	6.5	1.6	4.1

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(net tons[1])

	All Castings		Miscellaneous Castings		Heavy Steel Ingot Molds		Chilled Railroad Car Wheels	Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[3]
	Total	For Sale	Total	For Sale	Total	For Sale	Total	Total[4]	Total[4]	
1951	14,988,555	8,453,046	9,573,347	4,471,539	2,614,517	1,257,542	639,996	1,473,192	687,503	.....
1952										
Nov.	1,060,735	593,779	649,316	296,674	218,349	104,035	41,655	99,196	52,219	1,309,252
11 mo.	11,718,779	6,752,630	7,379,910	3,470,168	1,990,704	953,842	501,989	1,217,320	603,387	.....
Dec.	1,141,658	619,070	713,332	321,939	247,605	116,410	42,957	95,198	42,566	1,316,308
Total	12,860,437	7,371,700	8,113,242	3,792,562	2,238,309	1,070,252	544,896	1,312,518	651,472	.....
1953										
Jan.	1,161,945	622,392	730,216	324,830	252,181	118,514	38,385	93,930	47,233	1,333,255
Feb.	1,135,868	607,160	721,847	315,101	228,360	106,398	44,420	93,152	48,089	1,332,038
Mar.	1,264,271	674,720	800,390	341,656	250,447	119,630	41,414	114,885	57,135	1,375,886
Apr.	1,277,288	683,047	799,872	329,802	246,873	122,702	44,877	120,105	65,561	1,305,849
May	1,185,545	641,581	734,326	312,836	238,202	115,728	41,373	113,136	58,508	1,271,711
June	1,196,106	648,400	743,737	312,681	232,596	115,946	45,542	114,118	60,113	1,245,904
July	1,056,422	573,280	752,371	274,890	212,187	106,526	36,715	97,739	57,410	1,232,651
Aug.	1,069,392	588,543	646,902	286,449	217,930	107,428	40,327	107,805	56,428	1,222,612
Sept.	1,105,582	611,905	669,225	289,909	232,055	117,694	37,055	108,270	58,977	1,170,191
Oct.	1,141,526	650,229	669,757	300,249	245,966	124,177	41,917	118,306	65,580	1,075,538
Nov.	1,004,326	563,930	589,657	266,039	227,800	111,022	31,373	101,576	53,920	977,012
11 mo.	12,598,271	6,865,187	7,858,300	3,263,942	2,584,597	1,265,765	443,398	1,183,022	628,954	.....

Steel Castings—Shipments

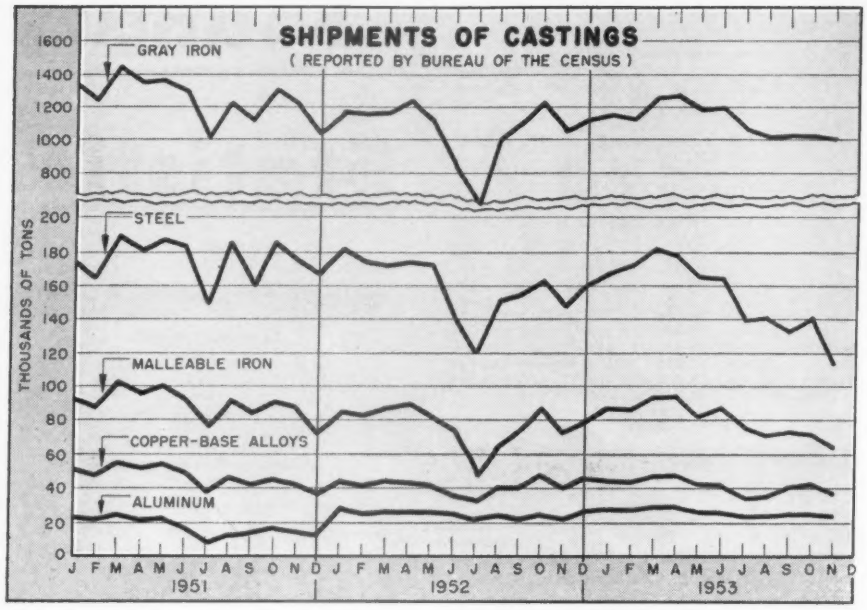
(Net tons[1])

	All Castings			Carbon Steel			Alloy Steel			Unfilled Orders[3]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1951	2,050,054	1,506,903	466,172	1,541,280	1,162,687	415,915	508,574	344,216	50,157	.....
1952										
Nov.	148,259	110,467	23,148	105,314	77,979	20,681	42,945	33,349	2,467	751,687
11 mo.	1,763,470	1,354,076	315,833	1,260,338	967,093	274,902	505,122	393,042	37,931	.....
Dec.	161,733	122,166	26,728	114,146	86,165	24,046	47,587	36,757	2,682	719,203
Total	1,925,203	1,476,242	339,561	1,372,494	1,053,264	298,948	552,709	430,429	40,613	.....
1953										
Jan.	167,211	126,819	27,150	118,423	118,423	24,788	48,788	38,121	2,362	706,490
Feb.	175,675	137,592	33,156	122,624	94,991	29,828	53,051	43,495	3,328	644,302
Mar.	182,181	141,873	34,364	129,055	100,069	31,772	53,126	42,286	2,592	634,600
Apr.	179,615	140,051	34,035	128,457	99,602	31,212	51,158	40,938	2,823	573,565
May	165,649	126,380	29,552	117,318	88,781	26,888	48,331	38,036	2,664	196,047
June	164,665	125,984	30,381	116,358	88,260	27,767	48,307	38,130	2,614	475,756
July	139,577	105,687	22,925	95,891	71,488	20,938	43,686	34,532	1,987	467,900
Aug.	141,340	107,941	25,026	97,076	73,784	22,637	44,264	35,003	2,389	418,927
Sept.	135,303	102,880	24,108	95,944	72,780	21,724	39,359	30,338	2,384	327,172
Oct.	140,702	106,788	25,354	100,568	76,118	23,449	40,134	30,988	1,905	313,684
Nov.	114,088	84,945	17,784	79,989	57,947	16,233	34,099	27,167	1,551	308,526
11 mo.	1,706,006	1,306,940	303,835	1,201,703	942,243	277,236	504,303	399,034	26,599	.....

[1] Source: Bureau of Census. [2] For sale only. [3] Based on new sampling method; not comparable to prior figures.
[4] All cast iron pipe is shipped for sale.

(Concluded on page 156)

FOUNDRY STATISTICS (Continued from page 155)



Index of Foundry Equipment Orders

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1952	1953
Jan.	404.5	30[illegible]
Feb.	200.4	25[illegible]
Mar.	310.0	396.[illegible]
Apr.	385.1	303.[illegible]
May	225.2	294.[illegible]
June	353.8	446.[illegible]
July	343.9	440.[illegible]
Aug.	311.6	633.[illegible]
Sept.	365.9	317.[illegible]
Oct.	335.8	202.[illegible]
Nov.	258.1	455.[illegible]
Dec.	343.3	494.[illegible]

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Ingot Brass & Bronze

(Shipments in net tons)

	1952	1953
Jan.	28,315	24,423
Feb.	24,211	25,429
Mar.	23,890	28,256
Apr.	22,547	25,044
May	21,740	21,660
June	21,274	20,818
July	18,947	19,321
Aug.	21,807	20,156
Sept.	22,770	21,463
Oct.	25,811	22,280
Nov.	23,441	21,860
Dec.	22,983	20,541
Total for year	277,736	271,251

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1951	478,996	324,964	.....
1952[3]			
Nov.	36,765	25,740	77,081
11 mo.	365,205	253,382	.....
12 mo.	408,353	282,673	.....
1953[3]			
June	49,051	31,255	88,060
July	39,360	25,221	83,034
Aug.	38,214	24,230	77,895
Sept.	38,965	26,403	72,631
Oct.	41,170	28,729	72,967
Nov.	38,032	26,461	69,218
11 mo.	484,916	334,299	.....

Coke Production and Consumption

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1951	79,133,744	78,868,124	3,664,404
1952			
Dec.	6,723,100	6,981,036	246,107
Total	68,254,109	67,865,639	3,102,446
1953			
Jan.	6,767,814	6,884,585	248,557
Feb.	6,132,084	6,263,083	237,670
Mar.	6,835,310	6,875,568	275,442
Apr.	6,538,477	6,536,195	272,229
May	6,820,985	6,748,957	274,236
June	6,613,614	6,683,768	254,830
July	6,750,381	6,656,222	218,470
Aug.	6,724,779	6,591,879	237,612
Sept.	6,406,103	6,332,401	237,119
Oct.	6,554,368	6,555,613	236,329
Nov.	6,208,155	6,039,813	216,837
Dec.	6,093,009	6,041,383	210,388
Total	78,445,349	78,209,467	2,919,719

Pig Iron Production and Consumption

	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1951	70,264.5	3,186.2	3,169.0	55,134.1	8,774.8	63,760	5,731	354	136
1952									
Nov.	6,138.9	262.0	315.4	4,842.6	718.8	5,472	397	21	12
11 mo.	54,887.1	2,570.8	2,698.2	43,147.1	6,435.7	49,226	4,990	245	99
Dec.	6,414.7	293.4	315.1	5,106.9	699.2	5,685	419	24	14
Total	61,306.8	2,864.2	3,013.3	48,254.0	7,174.9	54,911	4,909	269	113
1953									
Jan.	6,470.6	274.9	285.5	5,201.5	708.8	5,784	425	24	12
Feb.	5,802.6	187.0	294.6	4,640.7	680.3	5,027	418	24	14
Mar.	6,601.1	263.9	358.1	5,256.1	723.0	5,873	466	27	14
Apr.	6,161.6	244.7	327.1	4,885.6	704.2	5,568	478	28	12
May	6,508.5	210.0	347.7	5,237.0	713.8	5,844	436	24	14
June	6,288.0	201.6	313.4	5,075.0	698.0	5,581	437	24	12
July	6,425.9	213.5	344.4	5,145.1	722.9	5,580	367	20	15
Aug.	6,381.1	202.1	310.7	5,167.1	701.2	5.672	385	21	14
Sept.	6,121.4	209.4	310.4	4,927.0	674.5	5,379	393	22	16
Oct.	6,409.2	218.9	290.8	5,175.1	724.5	5,733	395	21	13
Nov.	5,995.5	201.0	277.2	4,859.3	658.0	.....	.....	.....	.....
11 mo.	69,165.5	2,427.0	3,459.9	55,569.5	7,709.2	.....	.....	.....	.....

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap—Total	All Scrap—Purchased	By Types of Furnace—Cupola—Total	Cupola—Purchased	Air—Total	Air—Purchased	Electric—Total	Electric—Purchased
1951	68,518,208	33,822,431	11,090,607	5,878,939	1,203,740	441,099	8,391,919	5,389,008
1952								
Oct.	6,256,031	3,066,041	851,458	439,401	98,947	37,743	814,565	546,189
10 mo.	49,575,392	24,662,305	7,528,046	3,970,370	880,384	330,023	6,476,177	4,181,429
Nov.	5,960,435	2,885,008	731,825	379,950	80,228	30,502	780,042	518,320
Dec.	6,089,722	2,973,633	804,275	412,177	92,621	35,064	758,845	491,084
Total	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,833
1953								
Jan.	6,256,718	3,061,551	810,254	413,971	95,430	35,695	795,292	517,963
Feb.	5,802,854	2,817,896	818,375	422,306	92,371	35,234	745,179	478,486
Mar.	6,536,867	3,211,476	901,786	464,110	103,034	38,583	857,760	563,489
Apr.	6,227,089	3,026,533	921,589	474,185	106,449	41,004	820,647	531,508
May	6,294,920	3,105,598	861,404	450,477	92,703	35,566	798,098	523,606
June	5,951,170	2,835,875	876,320	454,905	99,799	38,934	743,530	468,125
July	5,539,468	2,597,365	729,114	369,283	74,815	26,755	691,521	443,263
Aug.	5,637,759	2,614,153	753,272	390,741	77,047	28,167	678,968	428,333
Sept.	5,395,721	2,393,773	782,131	405,274	80,866	29,032	595,523	363,709
Oct.	5,628,568	.....	779,444	.....	75,618	.....	566,878	.....
10 mo.	59,271,134	.....	8,233,689	.....	898,132	.....	7,343,396	.....

*Source: U. S. Dept. of Interior. Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only [3]Based on new sampling method; not comparable to prior figures.

IMPROVED annealing cycles

through

A. P. GREEN *Engineered*

REFRACTORY LININGS

Oil-fired annealing oven for malleable castings. The flat suspended arch is KAST-O-LITE and the sidewalls are G-23 Insulating Firebrick.

Malleable operators report easier controlled annealing cycles through the use of the proper combination of A. P. Green refractories. Efficient furnace operation means lower production costs and better control of the physical properties of the castings. It can only be achieved by a refractory enclosure which contributes to the desired annealing cycle.

A. P. Green KAST-O-LITE insulating refractory castable was used throughout sidewalls and arch for this pulverized coal-fired oven.

The two ovens illustrated are typical examples of A. P. Green engineered refractory linings. One is a complete monolithic lining of A. P. Green KAST-O-LITE, a light weight castable refractory. The other is a combination lining—KAST-O-LITE arch and G-23 Insulating Firebrick sidewalls. Both have excellent performance records effecting improved product quality at reduced fuel costs.

The A. P. Green Fire Brick Company Engineering Department will assist you with further information on the application of these materials to new units or the conversion of existing furnaces. Call your local A. P. Green distributor . . . he's listed in the yellow pages of your telephone directory . . . or write . . .

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DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

Foundry Developments

By EDWIN BREMER

Metallurgical Edito

RECENT studies by G. N. J. Gilbert reported in the December 1953 issue of the *Journal of Research and Development* confirms previous work on the effect of phosphorus on galvanizing embrittlement of malleable iron. With a P content of 0.07 per cent and a Si content of 1 per cent, there is little danger at normal temperatures of embrittlement due to galvanizing. However, if such castings were to be used under very low temperature conditions, some galvanizing embrittlement might be detected, since by quenching the low P material from 450° C the transition temperatures would be raised. Gilbert recommends that when blackheart malleable is to be galvanized the P content should be below 0.1 and preferably below 0.07 per cent. If higher P contents cannot be avoided, then all castings should be quenched from 650° C before galvanizing.

* * *

CERTAIN standards leading to a more successful casting of high-temperature alloys into ceramic molds have been established, according to a recently issued report available from the Library of Congress, Photoduplication Section, Washington 25. Two important factors influencing success—use of special molding materials and proper preparation of molds—are given. If workpieces are cast according to the new technique, the castings will not only leave the molds much more accurate in size but also a considerable saving in material will be effected. Developments were carried on by Alloy Engineering & Casting Co. for the Department of the Navy. Report is designated PB 109239, "Advanced Casting Techniques and Processes." Comprising 147 pages, the price in microfilm form is $5.75; in photostat form $18.75.

* * *

IN A discussion of "Modern Casting Techniques" in *Philips Technical Review* (Eindhoven, Netherlands) H. J. Meerkamp van Embden, with specific reference to investment casting and dimensional tolerances, points out that high demands rarely are necessary for all dimensions, and a little machining will usually make the casting quite acceptable without much trouble. That is a matter of mutual agreement between designer, draftsman and caster, and a great deal of expense can often be saved by making a casting in such a way as to take the place of a combination of machine-made subparts. This is especially so since extra-high demands are made for each of the subparts to insure that the total tolerances are not too large on assembly. It is often cheaper to make one intricate casting and finish it by machining to the required final dimensions.

* * *

DESIGNING a special semitrailer attachment to add length to an electric platform truck permits Love Brothers Inc., Aurora, Ill., to increase the truck's capacity 75 per cent, according to Automatic Transportation Co., Chicago. Illustration shows one of the latter's 6000-lb capacity trucks moving a 10,500-lb load of molds from the molding department to the drying ovens.

* * *

PRELIMINARY tests have shown that a copper-silver-lead alloy containing 30 per cent Cu, 30 per cent Ag and 40 per cent Pb possesses most of the usual properties associated with bearing alloys, according to G. Llewelyn in the November, 1953 issue of *Metallurgia* (Manchester, England). No difficulties are associated with the casting and bonding qualities, while the general bearing properties are equal to, and in some instances better than, those of present day alloys. Improved mechanical properties at temperature should enable the alloy to be used under heavier loads and should minimize the danger of fatigue failure.

* * *

INDICATIONS point to the possibility of modifying soybean oil to give it drying properties comparable to linseed oil by "adduct" formation with urea. Adducts are chemical compounds or complexes which hold hydrocarbon chains within the crystal lattice in a long, twisted cylindrical shell. Urea cylindrical lattices are capable of unlimited extension and can enclose molecules containing as many as 30 carbon atoms linked in a straight chain.

* * *

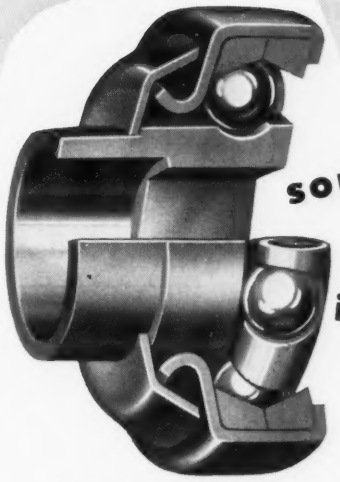
DETERMINATION of whether a molten salt bath used for heat treating steel is neutral or decarburizing can be ascertained easily, according to Ajax Electric Co. Inc., Philadelphia. Method is to immerse a discarded double-edge safety razor blade in the molten salt bath for 10 or more minutes, and then give the blade a quick water quench. If the blade bends, the carbon has been depleted, indicating the bath shows evidence of decarburizing. If the blade snaps, the bath is neutral.

* * *

SMALL self-contained sources of x-rays for use in industry and medicine soon may be a commercial reality as a result of work in progress at Armour Research Foundation, Illinois Institute of Technology, Chicago. Developed by Dr. Leonard Reiffel, the new x-ray source consists of a small quantity of radioactive material surrounded by a layer of some heavy metal. The radioactive center emits beta rays which are deflected from straight line paths during passage through the heavy metal, and that change in direction produces x-rays. The radiation may be cut off by removing the heavy metal shell and replacing it with a sheath of plastic which absorbs the beta rays without forming x-rays.

* * *

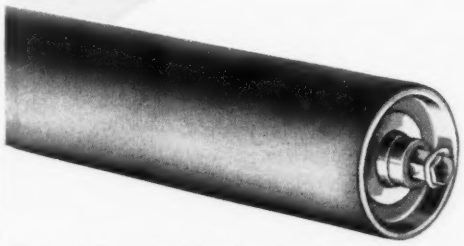
RECENTLY issued brochure, entitled "Understanding of Melt Quality" by J. G. Kura and sponsored by the Brass & Bronze Ingot Institute, points out the most common method for subjecting a melt to oxidizing conditions is to maintain an oxidizing atmosphere during melting. An oxygen content of about 0.5 per cent in the products of combustion of a gas flame will serve this purpose. Another method is to utilize an oxidizing flux or slag. Mixtures such as 1 to 3 parts of copper oxide, 1 part sand and 1 part borax have been used successfully to degas melts. Thoroughly cured and preheated furnace liners, ladles and tools are absolutely essential for production of high-quality melts, since damp tools, green crucibles and green transfer ladles can gas a melt severely.



X-Series Bearing Assembly
For new installations, and also interchangeable for replacement in existing Logan conveyors.

something NEW in a BEARING for conveyor rolls

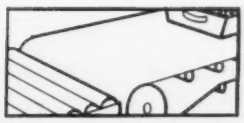
Write for folder, describing in detail, this important new Logan development for conveyor rolls. This is a low-friction, extra quiet bearing, known as X-Series. Semi-precision construction yet virtually the same price as ordinary conveyor roll bearings. Note: Less effort required to move molds on level push lines of roller conveyor. 33% less grade required on gravity lines. Now furnished in Logan 50, 55 and 60 Bearing Sizes. Write for details.



The most important bearing development for conveyor rolls in two decades.

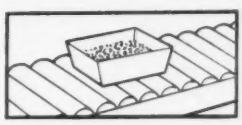
DEVELOPED BY Logan

LOGAN CO. 580 CABEL ST., LOUISVILLE, KY.



For Belt Conveyors

For Live Roll Conveyors



For Roller Conveyors

Around the Country

NEWS REPORTS FROM

Chicago
Los Angeles
New York
Detroit
Philadelphia

Chicago

CHICAGO district expanded its pig iron production capacity by 120,000 tons during 1953. According to the American Iron and Steel Institute, the 43 blast furnaces in the area had a total capacity of 15,340,270 net tons as of Jan. 1, 1954. This gain represents 0.8 per cent over the 15,220,270 tons available on Jan. 1, 1953.

The increase resulted principally from Interlake Iron Corp.'s rebuilding and enlargement of its South Chicago furnace "A", the smaller of two stacks there, from a daily capacity of 525 tons of pig iron to 850 tons. The furnace blew out for reconstruction on Apr. 2 and went back on Sept. 1. Only other change in Chicago district capacity ratings is a small downward revision for the three stacks of Youngstown Sheet & Tube Co. at its Indiana Harbor plant. This company built a third stack there in 1952 with a rating designated at 1500 tons a day or over. It is now regarded as a 1450-ton unit, the lower figure apparently being prompted by operating experience last year.

In three years Chicago district capacity has increased 702,290 tons, or 4.8 per cent. There has been no test of the adequacy of the current capacity, since starting in midyear 1953 demand for foundry iron slipped off and steelmaking operations averaged lower in first half, relieving the requirements for hot metal. Opinion is that present iron capacity is sufficient for peacetime needs.

* * *

Junior Achievement companies got their share of the headlines here during first week in February. To open Junior Achievement Week, on Feb. 1 some 26 youngsters manned counters on the main floor of Carson Pirie Scott & Co., selling 60 products made by JA companies. On Feb. 6-7, there was a Junior Achievement Trade Fair at the Coliseum where some 100 different products manufactured by the 204 JA companies in the Chicago area were exhibited. Some products are made by casting processes. One company operating in this field, for example, is the Blue Devils Foundry, sponsored by Crane Co. It makes cast bronze ornamental pieces.

* * *

Assembly operations on the first Pratt & Whitney J-57 turbojet production engine at Ford Motor Co.'s Aircraft Engine Division here got under way in January. Following test runs, this engine is scheduled to be used as a standby. Two other engines completed by a crack engineering department assembly crew have been tested and are reported to be meeting all requirements.

Los Angeles

THE downward trend in foundry activity continues unchecked for most shops, but an upturn this month or next is seen by most observers. Nonferrous shops complain that their activity is at a historic low. To keep crews together some foundry operators are using both skilled and unskilled help to clean windows, etc.

On five-day work schedules, some nonferrous shops are pouring only 50 per cent as much tonnage as last year. These shops were fairly busy in December working off orders placed in June and July. But that work is out of the shop and replacement orders are slow to appear.

Operations of ferrous shops are at 50 per cent of capacity, compared with 80 to 90 per cent last year at this time. February activity was about even with January. Reason advanced by most foundrymen for current depressed business levels is the heavy floor tax on inventories. Casting users are ordering lightly at this time since their casting stocks are taxed. However, it is likely that many casting users previously purchased more castings than needed to support current consumption.

Sales of refractories to foundries are sustained, indicating foundries are maintaining their furnaces.

Of great concern to foundrymen is the seething smog-front. Gordon P. Larson, director of the Los Angeles county smog district, has been summarily fired as director but retained in an advisory capacity. Larson's administration has been under fire for some time by the Board of Supervisors, which is seeking to quiet the public clamor to do something about smog. Despite the clean bill of health given Larson by the governor's advisory committee on smog, the board is combing the nation for a qualified scientist to assume Larson's $17,900 post. So far only one retired general has presented himself as candidate. But he was rejected.

Of vital concern to foundries is the decision of a major oil producer not to locate its new refinery in the Los Angeles area because of the increasingly chaotic smog condition. Apparently, the oil men fear that refineries may be in for the legislative "treatment" previously given local foundries. With refineries the area's No. 1 user of castings, any lessening of this market will affect foundry business.

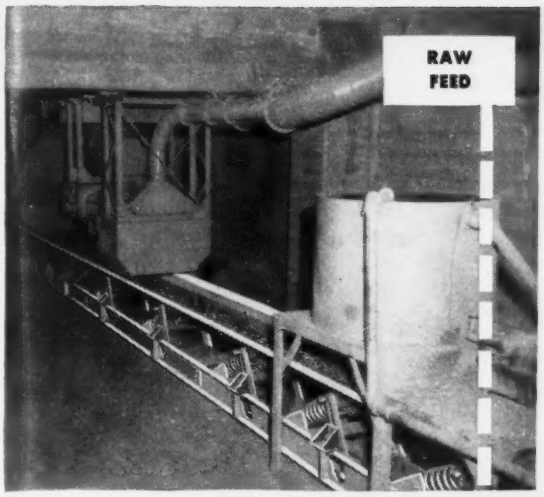
New York

UNTIL recently business has been definitely disappointing to gray iron foundry operators in this district. Anticipated return to at least preholiday levels failed to materialize, with various shops operating at little better than three days a week, some no better than two. Four and five day a week operations were exceptional.

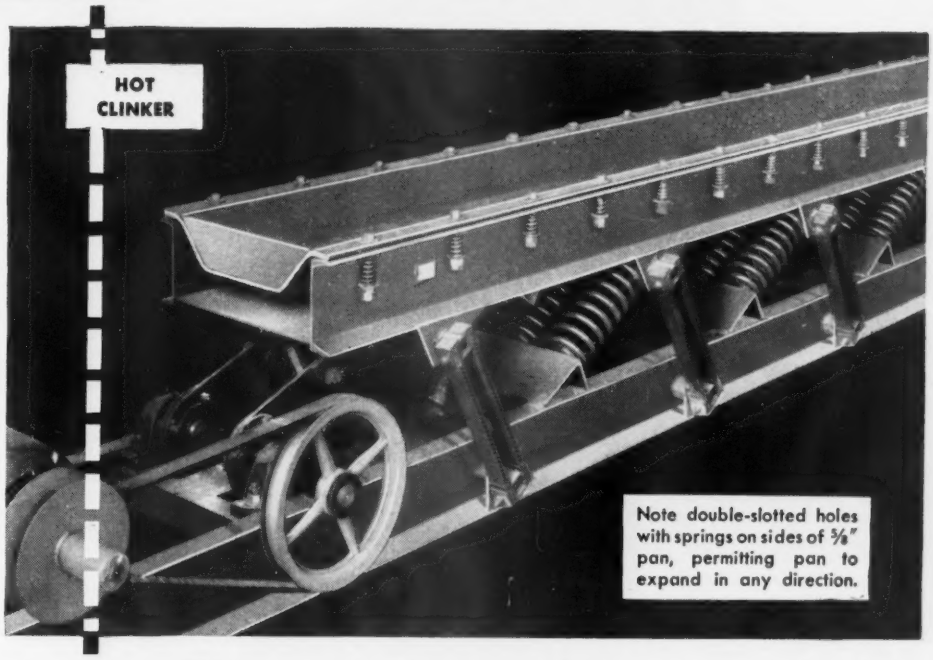
While still short of earlier forecasts, average operations today have crept up a little, and prospects for further improvement are a bit more encouraging. However, some leading trade interests believe there will be no really appreciable upturn before late March or early April.

Steel foundry operations, compared with gray iron, have been maintained at a better level, but backlogs are low and the contrast with a year ago is far more pronounced than in any other branch of the foundry industry

(*Concluded on page* 162)



TOUGH CONVEYING JOBS ARE *DUCK SOUP* FOR CARRIER ~~NATURAL-FREQUENCY~~ CONVEYORS

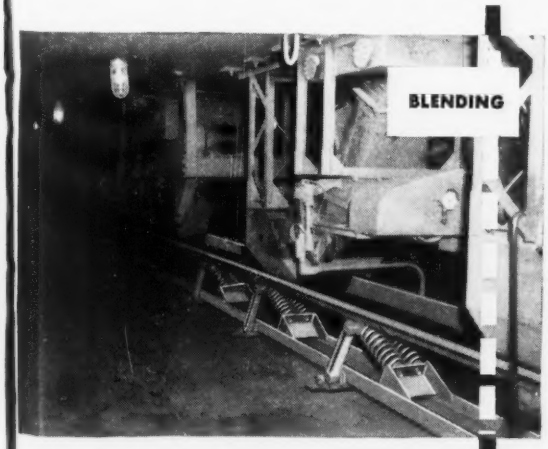


HIGH CAPACITY
Up to 80 tons per hour on 12" models!

HIGH TEMPERATURE
Up to 750° F. on standard models — 1600° F. on high-temperature models!

HEAVY-DUTY SERVICE
Pans up to ¾" plate!

LOW HORSEPOWER ASSURES LOW MAINTENANCE
1000 foot-tons per hour per H.P.!



The toughest job in a cement plant—*conveying and cooling hot clinker*—comes naturally to the rugged Carrier Natural-Frequency Conveyor shown above. By comparison, the raw-feed and blending operations are just plain duck soup, but Carrier Conveyors do all three jobs with equal ease and economy.

Cement-industry applications represent only a fraction of the many uses for Natural-Frequency Conveyors. These amazing conveyors are now moving scores of other hard-to-handle products—things like mill scale and slag . . . bulk chemicals . . . castings . . . food products . . . sand . . . machine turnings—conveying and processing them with spectacular success. If you handle anything hot, sharp, wet, brittle, abrasive, jagged or oily, it will pay you to get all the facts. Use the coupon, *today!*

Get the Facts Today!

Carrier Conveyor Corporation—Dept. F-3-4
Frankfort Avenue at Clifton, Louisville 6, Ky.

Gentlemen: Without obligation, please send complete information on Carrier Natural-Frequency Conveyors.

Firm_____

Street_____

City_____ State_____

Att: Mr._____ Dept._____

(*Concluded from page* 160)

in this district. Early in 1953 steel casting backlogs extended several months, as against several weeks at most at this time. Drop is ascribed primarily, although not altogether, to the shrinkage in defense requirements. Malleable shops are fairly active and here again operations are somewhat better sustained than in gray iron. But demand for malleable remains far from brisk.

Business in nonferrous castings is spotty. Captive shops are busy on meters and valves and certain types of precision instruments, but pump business is slower and maritime needs still drag.

FOUNDRY operations in and around Detroit continue spotty, though much improved over November and December levels. Steel, malleable and nonferrous foundries are faring best, most working about five days and some more. Gray iron foundries are down to less than five days in many cases, however, with some at two or three day operations.

Operators are not discouraged by the present situation, citing a return to more normal seasonal patterns in the automotive industry. Although an upturn was expected before this, opinion is strong that the next couple of months will see business stronger. "The auto companies will be humming about April," says one, "and we will too."

GRAY IRON foundry operators see some improvement, following a generally disappointing period since the first of the year. Business is still on a hand-to-mouth basis, with backlogs virtually nil. Operations at most jobbing shops are around four days a week but at a shade higher level than a few weeks ago. A particularly bright spot in gray iron is the improved operations at pressure pipe shops, which are operating on a double shift, a reflection of seasonal influences.

Steel shops are operating at a generally higher level than the gray iron plants. However, they, too, are on a more or less touch-and-go basis, with backlogs light. Malleable shops in the area are operating at about 75 per cent of average, with delivery promises ranging three to four weeks. Most are operating five days a week, with reduced working forces. Business in pipe fittings is fairly steady and some improvement is noted in agricultural equipment requirements. There is still not much change in general manufacturing assembly needs and railroad equipment requirements remain slow.

Brass and bronze shops with close control equipment continue to do very well. Perhaps they are as busy as any one group in the area. Requirements of electronic equipment manufacturers are helping considerably to sustain business among these shops. Those without such equipment, and this includes a number of the smaller shops, are finding business slow. Cutbacks in aircraft work are adversely affecting operations at the larger aluminum and magnesium casting plants. Some of these shops which had been operating six days a week are now on a five-day basis, and backlogs are definitely lighter. The smaller light metal shops are doing only moderately well.

CAREER CARNIVAL AT MSC: Display booths of 100 organizations drew an estimated 10,000 persons to the fifth annual Michigan State College Career Carnival recently. The cast metals industry was represented by a booth constructed by members of the MSC student chapter. Sponsors included the student chapter, the four Michigan chapters of the AFS and the Foundry Educational Foundation. A highlight of the carnival was the contribution of $2000 to the FEF by Archer-Daniels-Midland Co. In the scene above, Robert D. Dodge, Archer-Daniels-Midland, right, is presenting the check from his company to John F. Smith, Chevrolet-Saginaw Foundry, who is the chairman of the FEF advisory committee of MSC

Buffalo Gets Welding Show in May

The most elaborate display of welding equipment and accessories ever assembled will be on exhibit at the second welding and allied industry exposition, according to the sponsors of the show, the American Welding Society. The show will be held at the Memorial Auditorium, Buffalo, May 5-7, and the society's national spring technical meeting will be held at Hotel Statler, Buffalo, May 4-7.

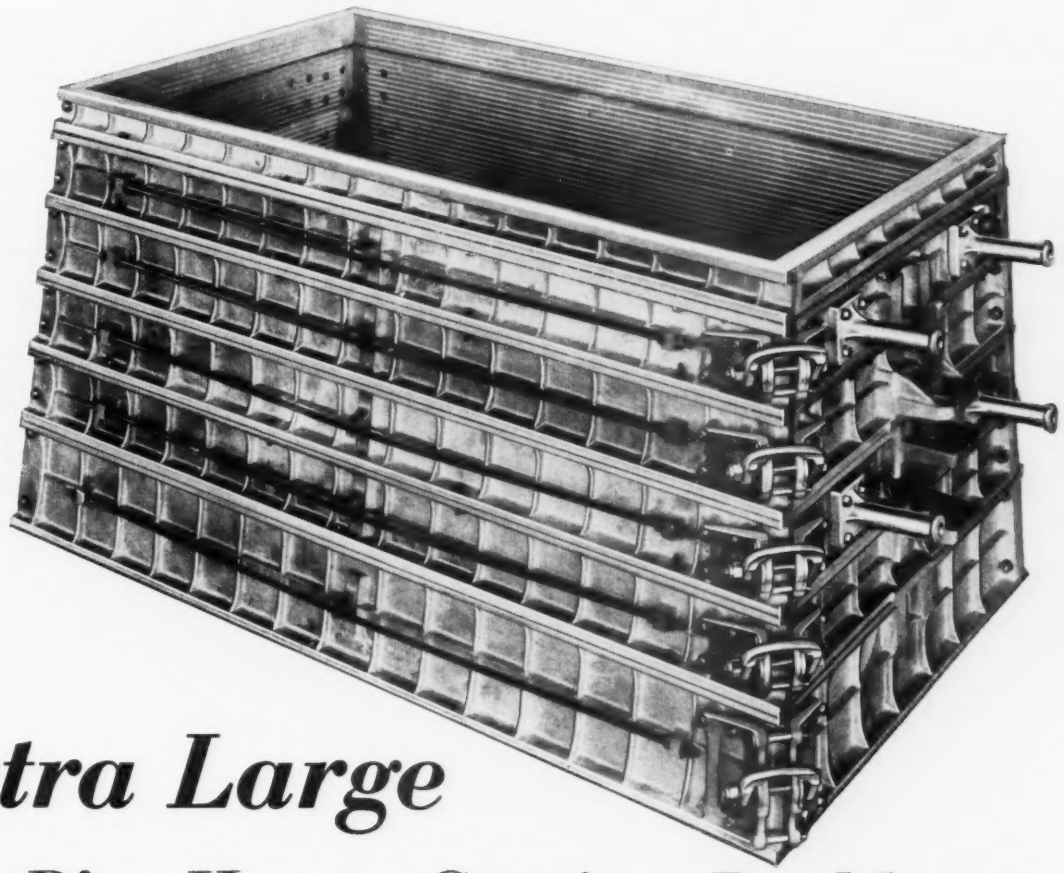
Advance registration cards and hotel information may be obtained from the American Welding Society, 33 West 39th St., New York 18.

Expand Alumina Plant

Expansion of facilities at the Mobile Alumina Works of Aluminum Co. of America increases its capacity 33 per cent since October, 1951, and makes the Mobile works one of the largest alumina plants in the United States. The increased facilities will make available sufficient alumina to produce over 100,000 tons of aluminum metal per year.

The Mobile works is on land leased from the Alabama State Docks Authority. With the exception of a small strip of land at one end of the property, all new facilities were added on land already under lease to Alcoa.

ADAMS *Aluminum Easy-Off Flasks*



Extra Large

For Big, Heavy Casting Problems

These flasks, equipped with upsets as illustrated above, offer you a maximum in depth combinations to suit many pattern contours. Adams construction features make them last longer . . . assure the production of more good castings in each day's run.

Cast iron and aluminum jackets in these same extra large sizes are available to complete this outstanding combination.

- **Rigid construction**
- **Solid corners**
- **Malleable trimmings**
- **Steel protecting strips**
- **Handles and trunnions (avail. when specified)**

Write today for further information.

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

700 Foster Street, Dubuque, Iowa, U.S.A.

INTERNATIONAL

TYPE **PK 20** MACHINE

JOLT SQUEEZE AIR PIN LIFT

Jolts, squeezes and draws. Pin lift all-purpose electric automatic cycle control.

Simply dial the jolts. Fast regulation for number of jolts required.

Safety features throughout.

Ready adjustments of cams for complete timing cycles. Fast, positive, dependable.

Continuous full cycle, split cycle, or manual controls.

Built to fit all foundry jobs.

Automatic Cycle control panel. A separate, complete unit, mounted to fit your particular foundry needs.

INTERNATIONAL MOLDING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

TRADE NAMES

of Foundry Equipment, Supplies and Services

THIS directory has been prepared as a special service to foundrymen who may have need for information concerning the producers of machines, materials and services distributed under various trade names and trade-marks.

The editors of *Foundry* appreciate the co-operation of the many companies serving the foundry industry whose kindness in supplying the information incorporated here has made this directory possible.

COMPILED BY THE EDITORIAL AND BUSINESS DEPARTMENTS OF

FOUNDRY

TRADE NAMES

In assembling these data, which were supplied by the individual companies represented in the listings, no effort has been made to differentiate between registered and unregistered trade-marks. Furthermore, the manner in which the trade names and trade-marks are set up or catalogued in this directory shall not be construed as denoting them as generic or free for general use.

The publishers assume no responsibility or liability as to accuracy of this material, or any misunderstanding or any misinterpretations thereof, including any claimed rights to the list of marks and names. Users of this section therefore should not, without independent verification, accept these trade-marks and trade names as being beyond possible dispute or error.

A 101—Rossborough Supply Co. — Aluminum flux.

A 104—Rossborough Supply Co.—Titanium flux.

A 106—Rossborough Supply Co.—Aluminum die casting flux.

A-305-50—Jos. T. Ryerson & Son Inc.—Gagger bars.

AB—Buehler Ltd.—Cutters, grinders, presses and polishers for metallurgical work.

AB BRAND—Anheuser-Busch Inc.—Dextrine, gum.

ABC—American Blower Corp. — Centrifugal compressors; power roof ventilators.

ABC—Alabama By-Products Corp.—Foundry coke.

ABC—Main Belting Co.—Heat-resistant conveyor belting.

AE PERFECT SPREAD—American Engineering Co.—Spreader stokers.

A-F—Alvey-Ferguson Co.—Roller, belt, apron and chain trolley conveyors; flask washing machines.

AP—M. A. Bell Co.—Silica-base core and mold wash.

A-SEE—Oak Hill Fire Brick Co. — Cupola blocks.

AT&FCO. — American Tank & Fabricating Co.—Ladles for pouring nonferrous metals.

ABMET—Quincy Foundry Inc.—White iron bearings for agricultural implements; stoker grades; white iron cleaning stars.

ACCO—American Chain Div.—Sling chains; American Chain & Cable Co., Inc.—Wire rope slings.

ACCO-DRI—Carpenter Brothers Inc.—Oil and grease absorbent.

ACCURATE—Accurate Match Plate Co.—Matchplates.

ACELITE—Goggle Parts Co. Inc.—All-plastic lenses.

ACME—Acme Abrasives—Grinding wheels.

ACME—General Refractories Co.—Fireclay brick.

ACHESON—National Carbon Co. Inc.—Graphite electrodes.

ADACAST—Botfield Refractories Co.—Castable refractory.

ADAHEARTH—Botfield Refractories Co. —Plastic chrome ore.

ADAMANT—Botfield Refractories Co.—Fire clay brick; high-temperature cement.

ADAMS—Adams Co.—Molding machines and flask equipment.

ADAMULL—Botfield Refractories Co.—Superduty fireclay brick.

ADAPTO—Logan Co. — Stock-size conveyor units.

ADJUSTABLE—Milwaukee Chaplet & Mfg. Co.—Radius chills.

ADJUST-A-LEG—Caldwell Co. — Equalizing sling wire rope and chain.

ADMIREZ—Archer-Daniels-Midland Co.—Synthetic resin binders.

AERO—Lee Rubber & Tire Corp.—Fire hose.

AEROCLONE—Turner & Haws Engrg. Co. Inc.—Dust separators.

AERODYNE—Aerodyne Development Co. — Mechanical dust collector.

AEROQUIP—Aeroquip Corp.—Hose; fittings; couplings.

AEROTEC—Thermix Corp.—Dust collectors.

AEROTURN—Turner & Haws Engineering Co. Inc.—Dust collectors.

AEROVENT—Aerovent Fan Co.—Industrial fans and ventilating equipment.

AERO-VIBE—Allis-Chalmers Mfg. Co.—Inertia type vibrating screen.

AERTITE—Johns-Manville—Coating for sealing boiler walls.

AFCO—American Felt Co.—Wool felts.

AGATE—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Dry nonsilica partings.

AGGREMETERS—Erie Steel Construction Co. —Material batchers.

AIMES—Aimes Co. Inc.—Centrifugal casting machines.

AIRFLOATED—Cedar Heights Clay Co. — Bonding clay.

AIR MASTER—Cleveland Rock Drill Division —Portable compressors.

AIR-RESTER—Standard Electrical Tool Co.—Dust collecting units.

AIR-RIGHTS—Elwell Parker Electric Co.—Fork truck.

AIR SAVER—Lonn Mfg. Co.—Foundry blow gun.

AIRTUBES—Lamson Corp.—Pneumatic tube systems.

AIR TUMBLER—Dust Suppression & Eng. Co.—Wet type dust collector.

AIRATOE—Pekay Machine & Engineering Co. —Sand aerator.

AIR-BLOC—Ingersoll-Rand Co. — Air-powered chain hoist.

AIRCHEK—Pennsylvania Pump & Compressor Co.—Compressor discharge line check valve.

AIRCO—Air Reduction Sales Co.—Industrial gases; torches; regulators.

AIRCROMATIC—Air Reduction Sales Co.—Welding process.

AIRFUGE—Swartwout Co.—Combination air separator and trap.

AIRJECTOR—Swartwout Co.—Industrial ventilators.

AIRLIFT—Swartwout Co.—Industrial ventilators.

AIRLOUVER—Swartwout Co.—Intake louvres.

AIRMASTER—LeRoi Co.—Air compressor.

AIRMOVER—Swartwout Co.—Industrial ventilators.

AJAX—Ajax Flexible Coupling Co.—Vibratory conveyors; flexible couplings; shakers.

AJAX—Ajax Tool Works Inc.—Chisel blanks; chisels.

AJAX - NORTHRUP — Ajax Electrothermic Corp.—Electric induction melting furnaces.

AJAX-TAMA-WYATT—Ajax Engineering Co.—Low-frequency induction melting furnaces for nonferrous metals.

AJAX-WYATT—Ajax Electric Furnace Corp.—Low-frequency induction melting furnaces.

AJAXOMATIC—Ajax Engineering Co.—Automatic pouring unit for nonferrous metals, especially for aluminum.

AKRO—Stoller Chemical Co. — Wood flour compound.

ALBANY—Delhi Foundry Sand Co.—Sand.

ALFRAX — Carborundum Co. — Refractory brick, tile, shapes, castables and cements.

ALGOMA—Hickman, Williams & Co.—Pig iron.

ALL MAKES—Collmer Brothers—Pipe cutter wheels.

ALL-PURPOSE—Mine Safety Appliances Co.—Plastic-coated work gloves.

ALL-STATE—All-State Welding Alloys Co.—Alloys and fluxes.

ALL-STATE 5 IN 1—All-State Welding Alloys Co.—Cutting electrode.

ALL-STATE NO. 430 KIT—All-State Welding Alloys Co.—Stainless steel solder kit.

ALL-WEATHER—Mine Safety Appliances Co. —First aid kits.

ALLBOND—Lauhoff Grain Co.—Cereal core binder.

ALLCAST—Apex Smelting Co. — Permanent mold and sand casting aluminum alloy ingot.

ALLEN—Allen Industrial Products—Lift truck and fork shovels.

ALLIGATOR—Flexible Steel Lacing Co.—Lacing for joining conveyor belts.

ALLIGATOR—Logan Co. — Roller conveyor switch.

ALLIGATOR V—Flexible Steel Lacing Co.—Fasteners for joining opened V-belting.

ALLISITE—Allis-Chalmers Mfg. Co.—Abrasion-resistant iron alloy.

ALLMUL—Babcock & Wilcox Co.—Firebrick.

ALLOY 99—Alloy Metal Abrasive Co.—Abrasive blast materials.

ALLOYMENT—Alter Co.—Nonferrous ingot, shot and flake.

ALMAG 35—William F. Jobbins Inc.—Aluminum casting alloy.

ALNOR DEWPOINTER—Illinois Testing Laboratories, Inc.—Dew point measuring instrument.

ALNOR PYRO LANCE—Illinois Testing Laboratories, Inc.—Pyrometer for molten nonferrous metals.

ALNOR VELOMETER—Illinois Testing Laboratories, Inc.—Air velocity measuring instrument.

ALOXITE — Carborundum Co. — Aluminum oxide-coated, bonded and grain abrasives.

ALUMAG—Electro Refractories & Abrasives Corp.—Ramming mix, fused MgO-Al_2O_3.

ALUMI-PLATE—Atlas Plastic & Aluminum Pressure Plate Co.—Matchplate.

ALUNDUM—Norton Co.—Abrasive; grinding wheels; refractories; nonslip tiles.

ALSIFER—Vanadium Corp. of America—Deoxidizer for steel castings.

ALSIMAG—American Lava Corp. — Ceramic strainer cores, gate tubes, cut-off cores.

ALUMEX—Mexico Refractories Co. — High-alumina firebrick.

AMABLAST—Alloy Metal Abrasive Co. — Abrasive blast materials.

AMALLOY—Alloy Metal Abrasive Co.—Abrasive blast materials.

AMALLOY—American Alloys Corp.—Aluminum, magnesium, titanium casting alloy.

AMASTEEL—Alloy Metal Abrasive Co.—Abrasive blast materials.

AMATEMP—Alloy Metal Abrasive Co.—Abrasive blast materials.

AMER-CLONE—American Air Filter Co.—Dust collector.

AMER-JET—American Air Filter Co.—Dust collector.

AMERA-MAG—American Tank & Fabricating Co.—Magnesium melting crucibles, skimmers.

AMERICAN—Carpenter Brothers Inc.—Illinois silica sand.

AMERICAN—American Clay Forming Co.—Ceramic strainer cores.

AMERICAN—American Fire Clay & Products Co.—Cupola and ladle refractories, molding sand, bonding clay.

AMERICAN—American Wheelabrator & Equipment Corp.—Airblast (sandblast) cabinets and rooms; pressure blast tanks; foundry core rod straighteners and shear machines.

AMERICAN EVERSHARP—American Steel Abrasives Co.—Chilled iron grit.

AMERICAN LONG-LYFE—American Wheelabrator & Equipment Corp.—Airblast nozzles.

AMERICAN STANDARDIZED — American Steel Abrasives Co.—Chilled iron shot.

AMERIKOR—Chas. A. Krause Milling Co.—Cereal core and facing binder.

AMMOGAS—Westinghouse Electric Corp.—Gas atmosphere generators for metal treating furnaces; electric heat treating furnaces.

ANDOK—Penola Oil Co.—Antifriction lubricants.

ANDREA—Andrea Mfg. Co.—Corebox vents.

ANGULAR—Globe Steel Abrasive Co., Pittsburgh Crushed Steel Co.—Abrasive grit.

ANNEALSHOT—Metal Blast Inc.—Shot and grit.

ANSUL—Ansul Chemical Co.—Sulphur dioxide, fire extinguishers.

ANTI-FLAME—Foundry Rubber Inc.—Bottom board and flask flameproofing compound.

ANTISEP—E. F. Houghton & Co.—Soluble cutting and grinding oil.

ANTI-SPATTER—Wolfe-Kote Co. — Welding compound.

AQUA-BOND—United Oil Mfg. Co.—Emulsified core binder.

AQUA-SET—United Oil Mfg. Co.—Synthetic type core binder.

AQUADAG—Acheson Colloids Co. — Colloidal graphite in water.

AQUADYNE—Aquadyne Corp. — Wet water compound.

ARC-BAN—Bausch & Lomb Optical Co.—Safety goggles.

ARC-LINE—W. O. Barnes Co. Inc.—Narrow width band saw blades.

ARCADE—Tacoone Pneumatic Foundry Equipment—Molding machines.

ARCAIR—Arcair Co.—Arc cutting torch using compressed air and carbon electrode.

ARCO—General Refractories Co.—High-alumina brick.

ARIDAIR—General Electric Co., X-Ray Dept. —X-ray film drier.

ARIDIFIER—Logan Engineering Co.—Mechanical air separator.

ARLCITE—Patterson Foundry & Machine Co.—High-density grinding balls.

ARMOUR—Armour & Co.—Abrasive cloth, sheets, belts, sleeves and discs.

ARO—Aro Equipment Co.—Grinders; air hoists.

ARROW—Arrow Tools Inc.—Pneumatic chipping chisels; airline filter and lubricator.

ASBESTO-SPONGE FELTED—Johns-Manville —High-temperature insulation.

ASBESTOCEL — Johns - Manville — High - temperature insulation.

ATLANTIC—Atlantic Saw Mfg. Co.—Metal cutting band saw blades.

ATLANTIC—Atlantic Abrasive Corp.—Grinding wheels.

ATLAS—M. A. Bell Co.—Carbon-base core wash.

ATLAS—Macwhyte Co.—Slings.

ATMOSET—A. P. Green Fire Brick Co.—High-temperature bonding mortar.

AUGER-MATIC—E. D. Coddington Mfg. Co.—Valve bag packer for filling bags with bulk materials.

AUTO-RATIO—Denver Fire Clay Co. — Oil burners.

AUTOMATIC—W. G. Reichert Engineering Co.—Molding, pouring, shakeout and indexing equipment.

AUTOMATIC-DISCHARGE—Electric Controller & Mfg. Co.—Lifting magnet controller.

AUTOTROL—Westinghouse Electric Corp. — Combined capacitor bank and switching means.

AUTOTRON—Autotron Co.—Photoelectric controls and light sources.

AUTRONIC—Swartwout Co.—Electronic control equipment.

AVON—Buckeye Products Co.—Nonsilica partings.

AXIFLO—Sturtevant Div., Westinghouse Electric Corp.—Axial flow fans.

AYRES—Ayres Mineral Co.—Foundry sands.

AZTEX—Mexico Refractories Co.—First quality, stiff mud firebrick.

B

B 11—Rossborough Supply Co.—Brass flux.

B-G—Barber-Greene Co.—Conveyors; car unloaders.

B-P MULLER—Baker-Perkins Inc.—Continuous molding sand mixer.

B & P—Brooks & Perkins, Inc.—Magnesium alloys, plate and sheet; raised pattern tread plate.

BR-4—Latrobe Electric Steel Co.—Abrasive-resistant steel for sandslinger liners, shot blast machines.

B S. & B.—Black, Sivalls & Bryson Inc.—Molding flasks.

BTF ALLOY—Bedford Tool & Forge Co.—Chipping chisels and blanks.

B & W—Babcock & Wilcox Co.—Refractories; tubes; boilers.

BWH—Boston Woven Hose & Rubber Co.—Belting; couplings; hose; V-belts; mechanical rubber goods.

BADGER—Geo. M. Pendergast & Co.—Heavy milled molding sand.

BAFFLE CRETE—Mexico Refractories Co.—Castable for monolithic baffle construction.

BAILEY—Wm. M. Bailey Co.—Pig casting machines.

BAKELITE — Bakelite Co. — Phenolic and epoxy resins for molding and bonding.

BAKOR—Bakor Oil Co.—Sand conditioner, degassed oil.

BALLCOTE—Hill & Griffith Co. — Brass ceramic core and mold wash.

BALTIC—Baldor Electric Co.—Totally enclosed electric motors.

BANROC—Johns-Manville — High-temperature insulation.

BANTAM—Schield Bantam Co.—Cranes; shovels; clamshells; magnets; piledrivers; draglines.

BANTAM BULLY—Superior Pneumatic & Mfg. Inc.—Light chipping hammer.

BANTY—Mercury Mfg. Co. — Medium-duty tractor.

BARNES—W. O. Barnes Co. Inc.—Hack saws; band saw blades.

BAYFLEX — Bay State Abrasive Products Co.—Disc wheels and straight wheels.

BEDCO ALLOY—Bedford Tool & Forge Co.—Chipping chisels and blanks.

BEDFORD—Bedford Foundry & Machine Co. —Electric overhead traveling cranes.

BEE BRAND—Richmond Glove Corp.—Work gloves.

BELMONT—Belmont Smelting & Refining Works Inc.—Brass and bronze ingots.

BELPASTE—Whitehead Bros. Co.—Core paste.

BELTEVATOR—E. W. Buschman Co.—Floor to floor belt conveyor.

BERLIN—Carpenter Brothers Inc.—Wisconsin bank sand.

BERLITE—Ironton Fire Brick Co.—Superquality refractory for cupola, ladles, ramming mix or wash coating.

BERYLCO—Beryllium Corp.—Beryllium alloy casting ingots.

BETTER BEST—United Metals Refining Co.—Babbitt.

BI-FLO—Aerovent Fan Co.—Bifurcated duct fans.

BIFURCATOR—De Bothezat Fans Div.—Axial flow duct fan.

BIG BULLY—Superior Pneumatic & Mfg. Inc.—Light chipping hammer.

BIG CHIEF—A. P. Green Fire Brick Co.—50% alumina firebrick.

BIG HORN—Wyotana Sales Co.—Wyoming bentonite.

BIG JOE—Big Joe Mfg. Co.—Hydraulic lift.

BILDROK—American Bildrok Co. — Mineral perlite for use as sand addition, riser insulation and ladle cover.

BILL-ETTES—Charles Dreifus Co.—Precision investment casting alloys.

BIN-DICATOR—Bin-Dicator Co. — Material level indicator.

BIN-FLO—Bin-Dicator Co.—Aerator unit.

BINKS—Binks Mfg. Co.—Mold spraying equipment.

B-J—W. O. Barnes Co. Inc.—Hack saw frames and blades.

BLACK DIAMOND—Peterson Core Oil & Mfg. Co.—Core oil.

BLACK DIAMOND—E. J. Woodison Co.—Core wash.

BLACK DIAMOND—Black Products Co.—Seacoal; pitch compound; core washes, partings; core pastes; plumbago.

BLACK HILLS—Eastern Clay Products Dept. —Bonding clay.

BLACK RAM—Ramtite Co.—Monolithic plastic refractory lining material.

BLACK VELVET—A. B. Farquhar Co.—Gravity conveyors.

BLACKHAWK—Standard Silica Corp.—Silica sand.

BLACKOAT—Delta Oil Products Co.—Washes.

BLASTCRETE—Blastcrete Equipment Co.—Refractory gun; angle nozzle.

BLASTFOE—Mine Safety Appliances Co.—Sandblasting helmet.

BLASTMASTER—Pangborn Corp.—Batch-type centrifugal blast cleaning barrel.

BLAW-KNOX — Blaw-Knox Co. — Clamshell buckets.

BLAZECRETE—Johns-Manville — Refractory cement.

BLOCKBINDER — Tincher Products Div. — Low-temperature metal applicator.

BLOFLEX — Flexaust Co. — Nonreinforced ventilation hose.

BLOMATIC—Beardsley & Piper Div.—Automatic core blower control.

BLOOMSBURY—Bloomsbury Graphite Co.—Graphite; plumbago; mold blacking; bentonite; seacoal; pitch; parting compound.

BLUE TRIANGLE CAST AID—Minerals Processing Corp.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

BOILING FLUX—Rossborough Supply Co.—Permanent mold fluxing material.

BOKO—Kurt Orban Co.—Patternmaker's milling machine.

BONDACTOR—Eastern Clay Products Dept. —Refractory gun applicator.

BOND-GUIDE—Haylco Controls Corp.—Automatic dispenser of sand additives.

BONDITE—Delta Oil Products Co.—Molding and core sand dry binder.

BONDOIL—Bakor Oil Co.—Core oils.

BONDSET—Mexico Refractories Co.—Silica-base bonding mortar.

BONISPRAY—Foundry Rubber Inc.—Permanent mold and die dressing.

BORESCOPE—American Cystoscope Makers Inc.—Telescopic light for casting inspection.

BOROBLAST—Simonds Abrasive Co.—Pressure blasting abrasive.

BOROLON—Simonds Abrasive Co.—Aluminum oxide grinding wheels.

BOROSIL—Ohio Ferro-Alloys Corp.—Boron-silicon ferroalloy.

BOYER—Boyer Campbell Co.—Welding helmets; welding hand shields; bulletin boards.

BRADLEY—Bradley Washfountain Co.—Washroom equipment.

BRANFORD—Branford Co. — Vibrators for flasks, bins, hoppers, railroad cars.

BRAZALOY—All-State Welding Alloys Co.—Fluxes.

BRI GUN—Basic Refractories Inc.—Refractory emplacing equipment.

BRIKCAST—General Refractories Co.—Castable firebrick.

BRIKLOK—General Refractories Co.—High-temperature fireclay mortar.

BRIKRAM—General Refractories Co.—Plastic firebrick.

BRILLIANT—S. Obermayer Co.—Parting compound; plumbago.

BRILLIANT—Ohio Ferro-Alloys Corp.—Ferroalloys.

BROLOC—Broderick & Bascom Rope Co.—Wire rope sling.

BRONCO—Brown Fintube Co.—Heat transfer equipment.

BROWNHOIST—Industrial Brownhoist Corp.—Cranes, buckets, unloaders.

BROWNWELD—Brown Fintube Co. — Heat transfer equipment.

BRUNDAGE — Brundage Co. — Blower-exhauster.

BRUSCO—Brummeler Steel Products Corp.—Automatic dump hoppers; parts boxes; hot forging boxes.

BRUTE—Aro Equipment Co.—Grinder.

BUCKET LOADERS — National Engineering Co.—Skip hoists.

BUCKEYE—Buckeye Tools Corp.—Portable air and electric tools.

BUCKEYE—Cleveland Quarries Co.—Cupola

—For addresses of companies mentioned above, see list starting on page 184—

patching and lining stone.

BUCKEYE—Buckeye Products Co.—Parting; high temperature furnace cement; patented flask guides.

BUCKEYE SILICAMIX—Cleveland Quarries Co.—Gun mix for patching cupolas.

BUDGIT—Manning, Maxwell & Moore Inc.—Crane assemblies; hoists; chain blocks; cord reels; bridge drives; conductor cord trolleys; wiring materials; I-beam trolleys; gantry "A" frames.

BUFFALO—Buffalo Forge Co.—Cupola blowers; unit heaters; air cleaning equipment; ventilating fans; sprue cutters.

BUFFALO—Buffalo Pattern Works Inc.—Patterns; permanent molds; models.

BUFFALO—Combined Supply & Equip. Co.—Foundry chaplets.

BUFFALO—United Compound Co.—Wax for core venting.

BUFFALO PATCH—Electro Refractories & Abrasives Corp.—Silicon-carbide mortar.

BULL DOG—Hill & Griffiths Co.—Core paste and binder.

BULL'S EYE—Universal Leather Co.—Welding gloves; asbestos gloves and mitts; protective leather clothing.

BULLNECK—Lincoln Engineering Co.—Hydraulic surface check grease fittings.

BULLY—Superior Pneumatic & Mfg. Inc.—Blow gun; air coupler and connector.

BURDETT—Burdett Mfg. Co.—Core ovens.

BURR ALUMINUM—Burr Oak Brass & Aluminum Co., Keyes-Davis Co.—Aluminum bottom boards, jackets, core plates, and shovel handles.

BURSTPROOF—B. F. Goodrich Rubber Mfg. Co.—Steam hose.

BUSS-WA—General Electric Co., Schenectady—Metallic conduits, housings, etc.

BUTLER—Butler Bin Co.—Front end loader.

C

CBR—Clipper Mfg. Co.—Reinforced abrasive blades.

CK—Carboline Co.—Wood pattern coating.

CM—Chisholm-Moore Hoist Corp.—Lever hoist puller.

CMC—Construction Machinery Co.—Core sand mixers; masonry saws.

CMD—Chicago Mfg. & Dist. Co.—Pneumatic core trucks; flasks; jackets; bottom boards; chipping hammers; bag holding trucks; skimmers; air separators.

CP—Chicago Pneumatic Tool Co.—Air compressors; air grinders; chippers; hoists.

CABINETROL—General Electric Co., Schenectady—Enclosed control panel equipment.

CABLE-LINK—Cable-Link Corp.—Conveyors.

CADET—Standard Electrical Tool Co.—Grinding, buffing and polishing machines.

CALABESTO—Pacific Graphite Co., Inc.—Core and mold wash.

CALCITE—Debevoise-Anderson Co. Inc.—Fluxing limestone.

CALIQUA—J. O. Ross Engineering Corp.—High-pressure hot water heating system.

CALOBAR—American Optical Co.—Lenses for safety glasses.

CANTON—Canton Products Co.—Pattern letters, figures, fillets.

CARB-X—Exothermic Alloys & Sales Service—Exothermic mold and stool inoculant.

CARBIC—Linde Air Products Co.—Processed carbide; acetylene flood lights and generators.

CARBO—Hill & Griffith Co., St. Louis Coke & Foundry Supply Co.—Carbonized cellulose sand stabilizer.

CARBO SIL—American Metallurgical Products Co.—Deoxidizer.

CARBOFRAX—Carborundum Co.—Refractory brick, tile, shapes and cements.

CARBOLOY—Carboloy Dept.—Cemented carbide cutting tools.

CARBON FREE LIQUIDIZER—Pittsburgh Metals Purifying Co.—Exothermic riser compound.

CARBOND—Joseph Dixon Crucible Co.—Carbon bonded crucibles; base blocks for crucibles.

CARBONITE—Hill & Griffith Co., St. Louis Coke & Foundry Supply Co.—Carbonized cellulose sand stabilizer.

CARBONUS—Vesuvius Crucible Co.—Carbon bonded crucibles.

CARBORA—Cortland Grinding Wheel Corp.—Grinding wheels.

CARBORUNDUM—Carborundum Co.—Silicon carbide-coated, bonded and grain abrasives.

CARGAN—Carpenter Brothers Inc.—Cupola gun mix.

CARGLAZE—Electro Refractories & Abrasives Corp.—Carbon brick.

CARGO-SCOUT—Elwell Parker Electric Co.—Fork truck.

CARL-MAYER—Carl-Mayer Corp.—Core and mold ovens.

CARLOADER—Clark Equipment Co.—Fork lift truck.

CARMAN—Edwin S. Carman Inc.—Foundry consultants and engineers.

CARO-LINE—Ironton Fire Brick Co.—Ramming mix for acid electric furnace and ladles handling electric steel and malleable iron.

CARRIER—Carrier Conveyor Corp.—Conveyors and feeders.

CARSCOOP—Butler Bin Co.—Front end loader.

CARTER—Carter Products Co. Inc.—Band saw wheels, guides, tires.

CASTABLE No. 27 and No. 30—Ironton Fire Brick Co.—Heat treating furnace walls and ladle covers.

CASTFLUX M-10—National Pigment Co. Inc.—Riser and head compound; deoxidizer and degasifier for ferrous metals.

CAST-MASTER—Cast Master Inc.—Die casting machines.

CAS-TO-FIT—Robinson Clay Products Co.—Castable refractory.

CASTORDAG—Acheson Colloids Co.—Colloidal graphite in castor oil.

CASTROLEUM—Penola Oil Co.—General purpose greases.

CATALIN—Catalin Corp. of America—Resin sand core binder and shell molding binder.

CATERPILLAR—Caterpillar Tractor Co.—Front end loaders.

CAVALIET—Ironton Fire Brick Co.—Foundry grade firebrick.

CEDAR HEIGHTS—Cedar Heights Clay Co.—Bonding clay; fire clay; brick mortar clay; plastic brick.

CEDARAPIDS SCHROCK—Iowa Mfg. Co.—Motorized head pulley.

CELASTIC—Wellman Products Co.—Lagging material.

CELLEX—Hill & Griffiths Co.—Harwood flour.

CEMCO—Cleveland Electro Metals Co.—Aluminum alloys.

CEMENT GUN—Cement Gun Co.—Furnace refractory applicator.

CENCO—Central Scientific Co.—Infrared moisture balance for sand moisture determination.

CENTRAL—Central Pattern Co.—Patterns; permanent molds; dies; matchplates; coreboxes.

CENTRI-MERGE—Schmieg Industries Inc.—Dust and fume eliminators.

CENTRO-LUBER—Lincoln Engineering Co.—Centralized lubricating system.

CENTRO-MATIC—Lincoln Engineering Co.—Centralized lubricating system.

CENTRO-OILER—Lincoln Engineering Co.—Centralized lubricating system.

CENTURY—Century Electric Co.—Electric motors and generators.

CENTURY—Vesuvius Crucible Co.—Clay-bonded crucibles.

CENTURY—Manley Sand Co.—Dried and screened naturally bonded molding sand.

CERE-ATOM—Illinois Cereal Mills—Cereal core binder.

CERES—Illinois Cereal Mills—Cereal core binder.

CERROBASE—Cerro De Pasco Corp.—Bismuth-lead alloy.

CERROSAFE—Cerro De Pasco Corp.—Bismuth-lead-tin-cadmium alloy.

CERROTRU—Cerro De Pasco Corp.—Bismuth-tin alloy.

CERTIFIED ANGULAR—Carpenter Brothers, Inc.—Chilled grit.

CERTIFIED SAMSON—Carpenter Brothers Inc.—Chilled shot.

CERTI-FIRE—Westinghouse Electric Corp.—Furnace testing devices.

CESCO—Chicago Eye Shield Co.—Goggles welding helmets, face shields.

CEYLON VELVET—Hill & Griffiths Co.—Graphite core and mold wash.

CHALLENGER—Coffing Hoist Co.—Lightweight spur gear hoists.

CHAMFERTRODE—Eutectic Welding—Arc welding electrode for chamfering.

CHAMPION SUPER SERVICE—Lee Rubber & Tire Corp.—Air hose.

CHATEAUGAY—Republic Steel Corp.—Low-phosphorus pig iron.

CHATTANOOGA—Tennessee Products & Chemical Corp.—Ferroalloy briquets.

CHECO—Crane Hoist Engineering Corp.—Crane systems and motorized crane trolleys.

CHELSEA—Chelsea Fan & Blower Co.—Exhaust fans.

CHEM-BRIX—Illinois Clay Products Co.—Refractory brick.

CHEM-REM—Speco Inc.—Chemical-resistant paint.

CHEMOX—Mine Safety Appliances Co.—Self generating oxygen breathing apparatus.

CHICAGO—Chicago Wheel & Mfg. Co.—Mounted and grinding wheels.

CHICOPEE—Shell Process Inc.—Shell molding machines.

CHILLKOAT—Delta Oil Products Co.—Coating for gray iron cores to produce chilling effect.

CHIP-A-WAY—Prab Conveyors Inc.—Steel belt conveyor.

CHIP-BAN—Bausch & Lomb Optical Co.—Safety glasses and goggles.

CHIPMASTER—Multi Finish Mfg. Co.—Pocket-size chip remover.

CHROM-SIL-X—Exothermic Alloys & Sales Service—Exothermic ferrochrome-silicon.

CHROM-X—Exothermic Alloys & Sales Service—Exothermic ferrochrome.

CHROMALOX—Edwin L. Wiegand Co.—Electric heaters.

CHROME CASTABLE—Johns-Manville—Refractory cement.

CHROME CONCRETE—Mexico Refractories Co.—Chrome base castable refractory.

CHROMEX—Harbison-Walker Refractories Co.—Chrome brick.

CINCINNATI—Cincinnati Electrical Tool Co.—Portable electric tools; grinders; buffers; cut-off machines; dust collectors.

CINCINNATI—Cincinnati Milling Products Div.—Grinding wheels.

CIRCLAIR—General Electric Co., X-Ray Dept.—X-ray film drier.

CIRCLINE—General Electric Co., X-Ray Dept.—Radiograph illuminator.

CITCOTE—Cities Service Oil Co.—Core wash.

CLARATOR—Clark Instrument Inc.—Dial indicator tester.

CLARK—Clark Instrument Inc.—Rockwell testing machine.

CLARK DUOFLEX—All Steel Welded Truck Co.—Casters; core trucks; shelf trucks.

CLARKAT—Clark Equipment Co.—Industrial towing tractor.

CLARKETTE—Clark Equipment Co.—Industrial towing tractor.

CLARKTOR—Clark Equipment Co.—Industrial towing tractor.

CLARK'S—Clark Cast Steel Cement Co.—Metal cement filler for ferrous castings.

CLAYTON SILICA—Concrete Material & Construction Co.—Foundry sand.

CLEANBLAST—Alloy Metal Abrasive Co.—Abrasive blast materials.

CLEANER-SANITIZER—Mine Safety Appliances Co.—Detergent powder for cleaning and sanitizing safety equipment.

CLEARFIELD—Clearfield Machine Co.—Foundry sand mixers.

CLECO—Cleco Div.—Portable air tools.

CLEVELAND—Cleveland Automatic Machine Co.—Die casting machines.

CLEVELAND—Cleveland Vibrator Co.—Metallic-impact type of air-powered vibrators.

CLEVELAND—Cleveland Chain Mfg. Co.—Chain, slings, hoists, cranes, winches.

CLEVELAND — Cleveland Standard Pattern Works—Patterns.

CLEVELAND—Cleveland Tapping Machine Co.—Tee fitting tapping machines.

CLEVELAND—Cleveland Chaplet & Mfg. Co. —Chaplets and chills.

CLEVELAND TRAMRAIL — Cleveland Crane & Eng. Co.—Overhead materials handling equipment.

CLIFTON—Buckeye Products Co.—Nonsilica partings.

CLIMAX—Federal Foundry Supply Co.—Wire straightener.

CLIPPER—Clipper Mfg. Co.—Masonry saws and diamond blades.

CLIPPER—A. P. Green Fire Brick Co.—Super-duty firebrick.

CLIPPER—Clark Equipment Co.—Fork lift truck.

COBALT—American Optical Co.—Lenses.

COLEMAN—Coleman Engineering Co.—Shell-molding engineering and research.

COLEMAN—Foundry Equipment Co.—Core, mold and heat treat ovens.

COLES—Coles Cranes Inc. — Mobile crane suitable for clamshell and magnet operation.

COLLMER—Collmer Brothers—Grinding wheel dressers.

CO-LOIDAL-AC—American Lacquer Solvents Co.—Pattern lacquer.

COLUMBIA—Frederic B. Stevens Inc.—Shake-bag parting for aluminum and malleable foundries and coreboxes.

COLUMBIA-SOUTHERN — Columbia Southern Chemical Corp.—Soda ash, caustic soda and other alkalies.

COLUMBUS—Hecklethorn Mfg. & Supply Co. —Industrial spring dampener.

COMBINATION UNIT—Beardsley & Piper—Combination of a Preparator and Speedmuller.

COMBS—Great Western Mfg. Co.—Gyratory foundry riddles.

COMET—Chisholm-Moore Hoist Corp.—Electric hoist.

COMFO—Mine Safety Appliances Co.—Respirator.

COMMANDER—B. F. Goodrich Rubber Mfg. Co.—Air hose.

COMPACT—Carrier Conveyor Corp. — Conveyors and feeders.

CONAFORM—Patterson Foundry & Machine Co.—Vacuum dryers.

CONCENCO—Deister Concentrator Co.—Hydraulic sand conditioner; air or liquid spray nozzles.

CONCO—Conco Engineering Works—Cranes; jibs; hoists; trolleys.

CONDOR—Manhattan Rubber Mfg. Div.—Hose.

CONDUHARD—Olds Alloys Co.—High-conductivity copper.

CONNECTICUT—Debevoise-Anderson Co. Inc. —By-product foundry coke.

CONTINUOUS-FLO—Pangborn Corp. — Continuous-type centrifugal blast cleaning barrel.

CONTRA TORQUE—Electric Controller & Mfg. Co.—A-C bucket crane control.

CONTROLLED "T"—Hickman, Williams & Co., National Metal Abrasive Co.—Shot and grit.

CON-VAY-IT—American Conveyor Co.—Bulk materials conveyor.

COPALLOY—Bohn Aluminum & Brass Co.—Babbitt.

COPPERTITE—Pittsburgh Metals Purifying Co.—Flux for high-conductivity copper castings.

CORALUX—F. E. Schundler & Co. Inc.—Treated perlite.

COR-BLO — Harrison Machine Co. — Core blowers.

CORDIP—U. S. Graphite Co.—Core coatings.

CORDOPREG—Cordo Molding Products Co.—Sand core drier molding compound, glass reinforced.

CORE DAUB—Frederic B. Stevens Inc.—Core patching material.

CORE PITCH—Mobile Rosin Oil Co.—Viscous resinous material with an acid number of 91.

CORECOATS—Foundry Services Inc.—Core wash.

COREHESIVE—Thiem Products Inc.—Core paste.

COREMAKERS—Core Makers Co.—Sand cores for foundries.

CORFOAM—Rezolin Inc.—Plastic for tool core structures.

CORMOL—Lava Crucible Co. of Pittsburgh—Zircon mold and core wash.

CORMATIC—Beardsley & Piper—Automatic coreblowing and handling control.

CORONA—S. Obermayer Co.—Core compound.

COROX—Westinghouse Electric Corp.—Heating elements.

COR-SIL—Frederic B. Stevens Inc.—Refractory core and mold wash.

CORTEX—Cortland Grinding Wheel Corp.—Grinding wheels.

COSMOWHEEL—Chicago Rubber Co.—Universal rubber contact wheel for belt grinding.

COTTRELL—Research Corp.—Electrical precipitator.

COUNTERFLO—Dravo Corp.—Warm air space heaters.

COVERGLAS—American Optical Co.—Safety goggles.

COXEY—Industrial Silica Corp.—Unwashed silica sand for acid steelmaking furnace bottoms; natural semi-bonded silica sand for heavy steel castings.

CRADLE — O. C. K. Hutchinson—Crucible tongs.

CRAFT—Milwaukee Leather Belting Co. — Leather fillet.

CRESCENT—Crescent Brass & Pin Co.—Foundry nails; skim gates; core wires; core plates and shims; taper drive plugs.

CROSBY—American Hoist & Derrick Co.—Wire rope clips and blocks.

CROWN—Robinson Clay Products Co.—High-temperature bonding mortar.

CROWN HILL—Federal Fouidry Supply Co.—Seacoal.

CRUNDUMSAND—Keystone Refractories Co. —Refractory sand.

CRYSTAL—Hickman, Williams & Co.—Fluorspar.

CRYSTALITE—Richard C. Remmey & Son Co. —Mullite refractories.

CRYSTOLON—Norton Co.—Abrasive, grinding wheels, refractories.

CUPLOPAX—National Foundry Sand—Monolithic refractory lining for cupolas, gun placement.

CUPOLA—Denver Fire Clay Co.—Firebrick.

CUPOLA GLAZE—Pacific Graphite Co. Inc.—Cupola flux.

CUPOLA PATCH—Electro Refractories & Abrasives Corp.—Ramming mix, high alumina.

CUPOLA TORCH—North American Mfg. Co. —Gas burner for lighting cupolas.

CUPOLINE—Eastern Clay Products Dept.—Cupola refractory.

CURTIS—Curtis Pneumatic Machinery Div.—Air compressors, hoists and cylinders.

CUSH'N-BLO—Ideal Industries Inc.—Soft-face hammers.

CUSTOM BLASTING—Cargill-Detroit Co.—Special shot cleaning and peening service.

CUTINSERT—Martin Engineering Co.—Rubber sheet material.

CUTTRODE—Eutectic Welding Alloys Corp.—Arc welding electrode for gouging, cutting, piercing.

CYCLOIDAL—Garden City Fan Co.—Fan (exhauster, mill).

CYCLONE—Chisholm-Moore Hoist Corp.—Hand chain hoist.

D

DFC—Denver Fire Clay Co.—Melting furnaces; combustion blowers.

DSM—Detroit Sheet Metal Works—Core ovens; industrial washing machines; dust collectors.

D & S—M. A. Bell Co.—Core and mold wash base.

D-SAVAGE—Durex Refractories—Firebrick.

DAG—Acheson Colloids Co.—Colloidal graphite, molybdenum disulphide, vermiculite, zinc oxide, in various liquids.

DANDUX—C. R. Daniels Inc.—Belting.

DAUBPAX—Pyro Refractories Co.—Cupola ramming fire brick.

DAVENPORT—Stahmer Shoe Co.—Wood-sole safety shoes and sandals.

DAVENPORT—Davenport Machine & Foundry Co.—Molding machines.

DAVIS—Ohio Fire Brick Co.—Cupola blocks.

DAYTON RING VALVE—Dayton Pneumatic Tool Co.—Pneumatic chipping hammers and sand rammers.

DAYTON-SAFETY—Simonds, Worden, White Co.—Grinding wheels.

DECO—Denver Equipment Co.—Foundry sand reclamation system.

DEEP CLEANER—Cargill-Detroit Co.—Blast cleaning machine.

DEFIANCE—Goggle Parts Co. Inc.—Goggles and helmets.

DE-ION—Westinghouse Electric Corp.—Circuit breakers.

DELCO—Cities Service Oil Co.—Core oil; core wash.

DELCOTE—Cities Service Oil Co.—Core wash.

DELHI—Delhi Foundry Sand Co.—Foundry sand, fluorspar; bentonite; clays; silica grits.

DELTA—Delta Power Tool Div.—Woodworking and metalworking machines.

DELTA—Delta Oil Products Co.—Core oils; spray binders; core and mold washes; partings; mold seal compounds.

DELTA—Carpenter Brothers Inc.—Wisconsin molding sand.

DELUGE—B. F. Goodrich Rubber Mfg. Co.—Water hose.

DEMMLER—Wm. Demmler & Bros. — Core and mold blowing machines; corebox vents; vent inserting drills.

DEMPSTER-DUMPSTER — Dempster Bros. — Truck-mounted device for hauling and dumping special containers.

DENSILTITE—Pittsburgh Metals Purifying Co.—Ladle flux for iron.

DE-OX-TUBES—Foundry Services Inc.—Nonferrous alloy deoxidizer.

DEPTHMASTER—Pekay Machine & Engineering Co.—Turret lathe depth controller.

DESMOND—Desmond Stephan Mfg. Co.—Grinding wheel dressers.

DESMOND SIMPLEX—Desmond Stephan Mfg. Co.—Vises.

DESPATCH—Despatch Oven Co.—Core and mold drying ovens.

DETROIT—Detroit Hoist & Machine Co.—Hoists and cranes.

DETROIT—Detroit Testing Machine Co.—Metal testing machines.

DETROIT—Detroit Electric Furnace Div.—Rocking electric melting furnace.

DETROIT CORE COMPOUND—Frederic B. Stevens, Inc.—Pure gum binder.

DE VILBISS—De Vilbiss Co.—Spray equipment; air compressors; fluid and air hose; spray booths.

DEVILS PUTTY—Botfield Refractories Co.—Graphite-base plastic fire brick.

DEWCEL—Foxboro Co.—Dew point sensing element.

DIAMOND—Diamond Clamp & Flask Co.—Falsks; jackets; core and bottom plates; flask clamps.

DIAMOND—Springfield Facing Co.—Non-silica parting.

DIAMOND—Asbury Graphite Mills Inc.—Core and mold wash.

TRADE NAMES

DIAMOND D—Tennessee Products & Chemical Corp.—Low-phos. high-carbon pig iron.

DIAMOND-JO—A. P. Green Fire Brick Co.—High-temperature bonding mortar.

DIAMONITE—Diamonite Division—Blast nozzles; electrical insulator guides and supports for induction heating and welding; tumbling mill grinding rods.

DIE SLICK—G. W. Smith & Sons—Mold lubricant.

DIECO—G. W. Smith & Sons—Permanent mold coating.

DIETERT-DETROIT—Harry W. Dietert Co.—Testing and control equipment.

DIMUL—Electro Refractories & Abrasives Corp.—Bonded mullite brick.

DINGS—Dings Magnetic Separator Co.—Magnetic pulleys; lifting magnets.

DISCERATOR—Thomley Mfg. Co.—Sand conditioner.

DISKETTE—Franklin Balmar Corp.—Portable electric grinder.

DIXIE BOND—Eastern Clay Products Dept.—Bonding clay.

DOALL—The DoAll Co.—Bandsaws; band filers; band machines; saw and file bands.

DOB-IT—Whitehead Bros. Co.—Core mudding compound.

DOC ALLOYS KIT—All-State Welding Alloys Co.—Maintenance brazing kit.

DOCO—Dayton Oil Co.—Core oils; washes; binders; chill coatings.

DON'T THROW THEM AWAY!—Wash-Rite Co., Inc.—Cleaning and processing of industrial work gloves and protective clothing.

DORFAN—Mechanical Industries Inc.—Dust collectors.

DOUBLE BEAD—Louden Machinery Co.—Monorail track.

DOUBLE SEAL—Double Seal Ring Co.—Piston rings.

DOUBLETON—Allis Chalmers Mfg. Co.—Multi-stage pumps.

DOUGHERTY—Dougherty Lumber Co.—Pattern lumber.

DOW CORNING 7 COMPOUND—Dow Corning Corp.—Silicone for breaking in shell mold patterns.

DOW CORNING 7 EMULSION—Dow Corning Corp.—Silicone parting agent for aluminum diecasting.

DOW CORNING 8 EMULSION—Dow Corning Corp.—Silicone parting agent for shell molding and zinc diecasting.

DOW CORNING 41 GREASE—Dow Corning Corp. — High-temperature-resistant silicone grease.

DOW CORNING 44 GREASE—Dow Corning Corp.—High-temperature resistant silicone grease.

DOWMETAL—Dow Chemical Co.—Magnesium alloys.

DRACCO "DH"—Dracco Corp.—Cloth bag dust filter units for extremely severe conditions.

DRACCO DUSTOMATIC—Dracco Corp.—Cloth bag dust filter units for severe conditions.

DRACCO MULTI-BAG—Dracco Corp.—Cloth bag dust filter units.

DRACCO UNI-FILTERS—Dracco Corp.—Small cloth bag dust filter units.

DRACCO WHIRL-CLONE—Dracco Corp.—Cyclone-type dust control units.

DRAGON—New York Belting & Packing Co.—Hot-materials conveyor belt.

DRAGON BRAND—Leschen Wire Rope Div.—Wire rope.

DRAVO—Dravo Corp.—Crane cab coolers and air conditioners; fabricated piping.

DREDNAUT—American Optical Co.—Goggles.

DREI-BRITE—Dreisbach Engrg. Corp.—Dry process barrel type descaling and cleaning equipment.

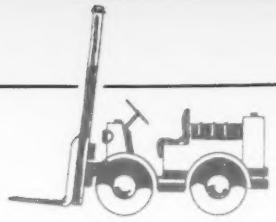
DREISBACH—Dreisbach Engrg. Corp.—Revolving self-contained blast barrels and reclaiming mills.

DRESSLER—Swindell-Dressler Corp.—Tunnel kilns.

DREW—Macwhyte Co.—Slings.

DRIAIR—New Jersey Meter Co.—Compressed air line separator.

DRI-BOND—Delta Oil Products Co.—Binder for molds and cores.



DRIKOAT—Delta Oil Products Co.—Wash.

DRILL-OM-ETER—New Jersey Meter Co.—Meter for measuring flow of compressed air.

DRYALL—Barber-Greene Co.—Rotary drum sand dryer.

DRY-SYS—Drying Systems Inc.—Core, mold, paste drying, ladle drying, black wash and paint baking ovens.

DUAL-FUEL—North American Mfg. Co.—Industrial burners.

DUALOC—American Chain & Cable Co., Inc.—Wire rope slings.

DUODYNE—Aerodyne Development Co.—Mechanical dust collector.

DUOLINE—General Electric Co., X-Ray Dept.—Radiograph illuminator.

DURA PRODUCTS—Eastern Clay Products Dept.—Corebox wear insert.

DURA SHIELD—New Jersey Matchplate Co.—Treated pattern and corebox equipment.

DURAFLEX—Jervis B. Webb Co.—Chain.

DURALITE—American Optical Co.—Goggles.

DURASTEEL—Cargill-Detroit Co.—Cut wire shot.

DURA-STIX—Keystone Refractories Co.—Firebrick cement.

DURAWELD—American Optical Co.—Goggles.

DUREGAN—Durex Refractories — Foundry gun mix.

DUREX—Durex Refractories—Plastic fire brick.

DUREZ—Durez Plastics & Chemicals Inc.—Phenolic resins for shell molding, core binding and foundry patterns.

DU-RITE—Ironton Fire Brick Co.—Super plastic for monolithic tap holes and cupola breasts.

DURO-BRACE—Allis Chalmers Mfg. Co.—Sheaves.

DURO PATCH—Pacific Graphite Co. Inc.—Furnace cements.

DUROX—Durex Refractories—Fire clay.

DUSKOLECTOR—Hammond Machinery Builders—Dust collector.

DUSTFOE—Mine Safety Appliances Co.—Dust respirator.

DUSTITE—Willson Products Inc.—Respirators.

DUSTUBE—American Wheelabrator & Equipment Corp.—Cloth-tube-type dust and fume collectors.

DUST-VUE MICROPROJECTOR—Mine Safety Appliances Co.—Dust counting device.

DYCOATS—Foundry Services Inc.—Permanent mold and die dressing.

DYFORM—Rezolin Inc.—Thermoplastic for high impact tooling.

DYNACLONE—W. W. Sly Mfg. Co.—Cloth type dust filters.

DYNALOG—Foxboro Co.—Electronic recorder.

DYNATHERM—Foxboro Co.—Resistance thermometer bulbs.

E

EC&M TYPE SW—Electric Controller & Mfg. Co.—Lifting magnets.

EC&M TYPE WB—Electric Controller & Mfg. Co.—Magnetic brakes.

EC&M WRIGHT CIRCUIT—Electric Controller & Mfg. Co.—Dc crane hoist control.

EF—Electric Furnace Co.—Annealing and heat treating furnaces.

EM—Electro Metallurgical Co.—Ferroalloy briquets.

EMS—E. W. Smith Chemical Co.—Metal fluxes.

EMS MOLD-FILM—E. W. Smith Chemical Co.—Film to prevent sticking of molten metal to mold.

E-Z POUR—Whiting Corp.—Ladle gear bracket.

EAGLE—S. Obermayer Co.—Core binder.

EAGLE—Whitehead Bros. Co.—Parting compound; facing material; core paste.

EAGLE-NON-SIL—Whitehead Bros. Co.—Parting.

EASYMOUNT—Sterling Abrasives Div.—Chuck and grinding wheel.

EATON—Eaton Chemical & Dyestuff Co.—Core sand coloring.

EBONY—Delta Oil Products Co.—Mudding and patching compound.

EBONY—Hill & Griffith Co., St. Louis Coke & Foundry Supply Co.—Core paste.

EBONY DAUB—Hill & Griffith Co.—Graphite core-mudding and sealing compound.

ECLIPSE—Eclipse Fuel Engineering Co.—Industrial heating equipment.

ECONOCAST—Econocast Inc.—Shell molding machines, patterns, consulting service.

ECONOWELD—Econoweld Corp. — Pallets skids; tote boxes.

EDCO—Christiansen Corp.—Aluminum alloy ingots; magnesium bottom boards.

EDDYMAG—Electric Controller & Mfg. Co.—A-C crane hoist controller.

EDER-LITE—Eder Instrument Co.—Miniature inspection lamps.

ELECTRIC—Electric Wheel Co.—Wheels; industrial trailers.

ELECTRIFUGAL—Allis Chalmers Mfg. Co.—Pumping unit.

ELECTRO—Electro Refractories & Abrasives Corp.—Grinding wheels.

ELECTRO SS—Electro Refractories & Abrasives Corp.—Pouring pit, stoppers.

ELECTROCARB—Electro Refractories & Abrasives Corp.—Silicon carbide grain and briquets.

ELECTROLON—Simonds Abrasive Co.—Silicon carbide grinding wheels.

ELECTROMAX—Leeds & Northrup Co.—Signalling controllers.

ELECTROMET—Electro Metallurgical Co.—Ferroalloys; metals; special graphitizers.

ELECTRO-STAYNEW—Dollinger Corp.—Electronic precipitators and mist collectors.

ELFURNO—Electric Furnace Co.—Special atmosphere generators and industrial furnaces.

ELOMA—Penola Oil Co.—Protective coating oil for metal.

EMBECO — Master Builders — Concrete for grouting heavy equipment.

EMERALD—Hill & Griffith Co.—Liquid parting.

EMERALD—Frederic B. Stevens Inc.—Core and mold coating for iron and steel.

EMERI-CRETE—Walter Maguire Co.—Heavy-duty, heat-resistant flooring.

EMPIRE—De Bardeleben Coal Co.—Coke.

EMPIRE—A. P. Green Fire Brick Co.—High-duty firebrick.

EMSOLVE—E. W. Smith Chemical Co.—Additive to control sludge and soot in fuel oils.

ENDOGAS—Westinghouse Electric Corp.—Gas atmosphere generators for metal treating furnaces.

ENDWELDUR—American Chain Div.—Sling chains.

ERIE—Erie Steel Construction Co.—Material storage bins; clamshell and dragline buckets; traveling cranes.

ERIE—Harrison Machine Co.—Compressor governors, unloaders and regulators.

ERIE-STRAYER—Erie Strayer Co.—Motor-driven clamshell bucket.

ERIEZ—Eriez Mfg. Co.—Permanent magnetic pulleys and plate magnets.

EROSET—Electro Refractories & Abrasives Corp.—Silica fireclay mortar.

ESS-I-SEE—Lava Crucible Co. of Pittsburgh—Ring linings; furnace covers; base blocks; cements.

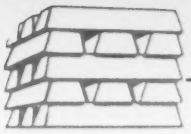
ESSO—S. Obermayer Co.—Parting compound; core mudding compound and dough roll; core paste and binder; core and mold washes; core compound; core binder; foundry flour; aluminum, brass fluxes; head compound.

ESSO NO. 36 AND 37—Ramtite Co.—Silicon carbide mortar.

ESSO NO. 38 AND 300—Ramtite Co.—Silicon carbide ramming mixes.

ESSO BOND—Ramtite Co.—Air setting refractory mortar.

—For addresses of companies mentioned above, see list starting on page 184—



ESSO-CAST NO. 90—Ramtite Co.—Castable refractory.

ETERNA METAL—City Pattern Foundry & Machine Co.—Heat treated alloy for metal patterns.

EUREKA—M. A. Bell Co.—Core paste.

EUREKA DRAWALLOY—Welding Equipment & Supply Co.—Hard facing electrodes.

EUREKA FORGEWELD—Welding Equipment & Supply Co.—Welding electrodes.

EUTEC-ARC—Eutectic Welding Alloys Corp. —Arc welding machine.

EUTEC-TORCH—Eutectic Welding Alloys Corp.—Torch welding machine.

EUTECRODS—Eutectic Welding Alloys Corp. —Torch welding rods.

EUTECTRODES—Eutectic Welding Alloys Corp.—Arc welding rods.

EVENGLOW—North American Mfg. Co.—Radiant tube gas burners.

EVERETT—Debevoise-Anderson Co. Inc.—By-product foundry coke.

EXACT WEIGHT—Exact Weight Scale Co.—Over-and-under weight scales; feeder machines; semi-automatic weighing machines.

EXCELO—Lee Rubber & Tire Corp.—Hot material conveyor belt.

EXCELLO—Bloomsbury Graphite Co.—Plumbago blacking.

EXHAUSTALYZER—Charles Engelhard Inc.—Exhaust gas analyzer.

EXIDE-IRONCLAD—Electric Storage Battery Co.—Battery for industrial trucks.

EXIDE-LIGHTGUARD—Electric Storage Battery Co.—Portable and emergency lighting unit.

EXIDE-MANCHEX—Electric Storage Battery Co.—Battery for emergency power and lighting and switchgear operations.

EXIDUST—Lamson Corp.—Centralized vacuum cleaning systems.

EXOCHROME—Exothermic Alloys & Sales Service—Low-carbon ferrochrome.

EXOGAS—Westinghouse Electric Corp.—Gas atmosphere generators for metal treating furnaces.

EXPLOSIMETER—Mine Safety Appliances Co. —Portable combustible gas indicator.

EY-BAR—Cleveland Electro Metals Co.—Special shapes for deoxidizing steel.

F

FABREEKA—Fabreeka Products Co.—Shock and vibration absorbent material.

FABROIL—General Electric Co., Schenectady —Gears and pinions.

FACEAMOL—Whitehead Bros. Co.—Facing material.

FACINE—Hill & Griffith Co., St. Louis Coke & Foundry Supply Co.—Shake-on facing.

FAGEOL—Fageol Heat Machine Co.—Portable oil-fired heat machines.

FALLS—Niagara Falls Smelting & Refining Div.—Nonferrous alloy ingots, alloys, hardeners, deoxidizers, degasifiers, anti-piping compounds, fluxes.

FALLS VILLAGE—Debevoise-Anderson Co. Inc.—Fluxing Limestone.

FAMOUS CORNELL FLUXES—Cleveland Flux Co.—Fluxes for iron and nonferrous metals.

FANCHILLET—Fanner Mfg. Co.—Internal chills.

FARNAMS—Debevoise-Anderson Co. Inc.—Fluxing limestone.

FARQUHAR—A. B. Farquhar Co.—Conveyors.

FASTICK—Frederic B. Stevens Inc.—Core paste.

FAULTLESS—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Dry nonsilica parting compound.

FEATHERWEIGHT—Dockson Corp. — Face shields.

FEDERAL—Federal Foundry Supply Co.—Sand stabilizer.

FEDERATED—Federated Metals Div.—Brass, bronze, aluminum and magnesium ingot metals.

FEEDEX—Foundry Services Inc.—Moldable exothermic feeding compound.

FEND—Mine Safety Appliances Co.—Protective hand creams.

FERRISIST—Chas. H. Milles Foundry Co.—Protective coating for melting kettles, thermocouple protecting tubes.

FERRO KOTE—Thiem Products Inc.—Core washes.

FERROCARBO—Carborundum Co.—De-oxidizing briquets.

FERROJET—National Clyinder Gas Corp.—Powder washing equipment.

FERROSEAL—Hill & Griffiths Co.—Graphite core and mold wash.

FESTUS—Manley Sand Co.—Silica sand.

FIBERFRAX—Carborundum Co.—Ceramic fiber.

FIBREX—Simonds Abrasive Co.—Reinforced resinoid bonded abrasive wheels.

FILLERARC—General Electric Co., Schenectady—Inert-gas-shielded arc welding equipment.

FILLERWELD—General Electric Co., Schenectady — Inert-gas-shielded arc welding equipment.

FILTERWELD—American Optical Co.—Lenses and plates.

FIRE KING—B. F. Goodrich Rubber Mfg. Co. —Conveyor belting.

FIREBLOK—Johns-Manville — Insulating refractories.

FIRECRETE—Johns-Manville—Refractory cement.

FIRE-FELT—Johns-Manville—Asbestos high-temperature insulation.

FIREFRAX—Carborundum Co.—Cements.

FIREGAN—Firegan Sales Co.—Quartzite ganister.

FIREITE—Johns-Manville—Asbestos furnace cement.

FIRESTONE—National Stone Co.—Cupola lining and patching.

FIROX—Illinois Clay Products Co.—Refractory cupola patch.

FIVE STAR—American Colloids Co. — Wood flour.

5 STAR—Steelblast Abrasives Co.—Malleabilized shot and grit.

FIXTURLOY—Bohn Aluminum & Brass Co. —Low melting point alloy.

FLAME KING—North American Mfg. Co.—Boiler burners.

FLAMENOL—General Electric Co., Schenectady—Wire and cable.

FLEX ELEX—Deister Concentrator Co.—Electric heater for sand screen jacket.

FLEX-A-FOAM—Goggle Parts Co. Inc.—Dust respirator.

FLEX-A-POWER—General Electric Co., Schenectady—Metallic conduits, housings, etc.

FLEXARC—Westinghouse Electric Corp.—Welding machines.

FLEXA-SWITCH — Metzgar Co. — Gravity conveyor, three-way switch.

FLEXAUST—Flexaust Co.—Reinforced flexible hose for dust collection and ventilation.

FLEXCO—Flexible Steel Lacing Co.—Belt fasteners for joining conveyor and elevator belts.

FLEXIBLO—Beardsley & Piper—Core blowers.

FLEXIBLOWMATIC—Beardsley & Piper—Automatic core and D-process blower.

FLEXI-GATE—M. A. Bell Co.—Rubber gating material.

FLEXO-FLASK—C. S. Humphrey Co.—Interchangeable aluminum flask sides and ends.

FLEX-RITE—Flex Rite Valve & Mfg. Co.—Air valves; spray guns.

FLEX-SET—Broderick & Bascom Rope Co.—Wire rope.

FLINT SHOT—Ottawa Silica Co.—Sandblast sand.

FLINTBRASIVE—Carpenter Brothers Inc.—Missouri sandblast sand.

FLOATEX—Hewitt-Robins Inc. — Shakeouts.

FLO-SET—Hanna Engineering Works—Speed control valves.

FLOTITE—Pittsburgh Metals Purifying Co.—Electric and acetylene welding flux.

FLO-VEYOR—Brady Conveyors Corp.—Sand handling system.

FLUALYZER—Charles Engelhard Inc.—Flue gas analyzer.

FOG-FILTER—R. C. Mahon Co.—Dust and fume control unit.

FOILLE—Mine Safety Appliances Co.—Burn treatment.

FORD—Hickman, Williams & Co.—Foundry coke.

FORGEWELD—Service Caster & Truck Co.—Casters.

FOUNDREZ—Reichhold Chemicals Inc.—Shell molding resins and core binders.

FOUNDRITE—Johns-Manville — Core plates; white slip jackets and liners for aluminum slip jackets.

FOUNDROMATIC—Allis Chalmers Mfg. Co.—Foundry shakeouts and dielectric core driers.

400 ALLOY—Apex Smelting Co.—Corrosion-resistant aluminum alloy ingot.

FOX—Fox Grinders Inc.—Swing frame grinders.

FOXBORO—Foxboro Co.—Cupola air weight controller; wind box pressure recorder.

FRACTO-CRETE—Ramtite Co. — Air-setting castable refractory.

FREEMAN—Freeman Supply Co.—Pattern supplies, equipment and lumber.

FREEMAN DOWMETAL—Freeman Supply Co. —Pattern plates.

FREFLO—Archer-Daniels-Midland Co.—Parting compound.

FRONTIER 40-E ALLOY—Frontier Bronze Corp.—Non-heat-treated aluminum alloy.

FULFLO—Superior Pneumatic & Mfg. Inc.—Air filter.

FULLER—Fuller Co.—Rotary compressors; rotary vacuum pumps.

FUL-VUE—American Optical Co.—Goggles.

FURNAS-CRETE—Mexico Refractories Co.—Castable refractory.

FURNATRON—Westinghouse Electric Corp.—Furnace temperature regulating systems.

FUSE BOND—E. J. Woodison Co.—High-temperature cement.

FUSETITE—Crescent Brass & Pin Co.—Radiator, shoulder, boiler, double head and motor chaplets.

FYRMATIC—Eclipse Fuel Engineering Co.—Oil-gas changeover burner.

G

G-20, G-23, G-26—A. P. Green Fire Brick Co. —Insulating firebrick.

G-E—General Electric Co., Chemical Dept.—Core and shell mold resin binders; silicone release agents for shell molding.

GF—General Foods Corp.—Corn cereal binder.

GLC—Great Lakes Carbon Corp.—Electrodes; graphite mold stock; electric furnace refractory graphite.

GALLIA RED—Carpenter Brothers Inc.—Ohio molding sand.

GAMMATRON—Gamma Corp.—Radiographic equipment using cobalt or iridium radiation.

GARDNER — Gardner Machine — Grinding wheels.

GARDNER-DENVER—Gardner-Denver Co.—Pumps; compressors; tampers and construction tools.

GARDWELL—Safety Clothing & Equipment Co.—Safety clothing and equipment.

GASFOE—Mine Safety Appliances Co.—Gas respirator.

GASMACO—Gas Machinery Corp.—Industrial furnaces.

GAS-O-MATIC—Baker-Raulang Co.—Gas-electric fork lift truck.

GASWELD—Liquid Carbonic Corp.—Gas cutting and welding equipment; industrial gases.

GEAUGA—Industrial Silica Corp.—Washed and dried silica core and mold sands; including shell mold sand; ganister.

GEHNRICH—W. S. Rockwell—Recirculating standard oven, bench and truck ovens.

GELKOTE L-910—Rezolin Inc.—For high gloss on L-900 tool.

GENERAL—Geo. M. Pendergast & Co.—St. Peter's silica sand.

GEORGE—Rolock Inc.—Tote box roller truck.

GIRDER RAIL—American Monorail Co.—Fabricated rail section.

GLASTEX—Dollinger Corp.—Filtering media.

GLOBE—Globe Iron Co.—Silvery pig iron; ferrosilicon.

GLOBE—Globe Hoist Co.—Oil-hydraulic materials handling lifts.

GLOBE—Globe Stamping Co.—Tumbling barrel.

GLOBELOY—Globe Iron Co.—Chrome-silicon alloy.

GLOVCO—U. S. Industrial Glove Corp.—Reconditioning of gloves and other safety wearing apparel.

GLUTRIN—Robeson Process Co.—Liquid core binder.

GLYDAG—Acheson Colloids Co.—Colloidal graphite in glycerine or glycol.

GODFREY—Godfrey Conveyor Co.—Conveying machinery.

GOLD BAND—Maxon Premix Burner Co.—Burner safety valves.

GOLD BOND—National Gypsum Co.—Fluorspar; limestone.

GOLD JACKET—Carpenter Brothers Inc.—Wisconsin silica sand.

B. F. GOODRICH—B. F. Goodrich Rubber Mfg. Co.—Fire hose; sand blast hose.

GOODYEAR—Goodyear Tire & Rubber Co.—Conveyor belting.

GOOSE LAKE—Illinois Clay Products Co.—Fire clays and firebrick.

GORDON-CAMPBELL—Claud S. Gordon Co.—Sand testing equipment.

GOULAC—American Gum Products Co.—Powdered core binder.

GRAB-IT—Edmont Mfg. Co.—Rubber-coated gloves.

GRAFLOK—Walsh Refractories Corp.—Plastic refractory; refractory mortar.

GRAINAL—Vanadium Corp. of America—Intensifier for carbon steel castings.

GRAKOAT—Delta Oil Products Co.—Wash.

GRAMIX—U. S. Graphite Co.—Powdered metallurgy product for bearings, machine parts, etc.

GRAN-ITE—Hickman, Williams & Co.—Clinkered dolomite refractory.

GRAPHIDOX NO. 4—Vanadium Corp. of America—Graphitizer for gray iron.

GRAPHITAR—U. S. Graphite Co.—Carbon graphite material molded to shapes such as bearings, seals, vanes, etc.

GRAPPLER—Edmont Mfg. Co.—Plastic-coated gloves.

GREAT SEAL—New York Belting & Packing Co.—Packings.

GREEN-X—A. P. Green Fire Brick Co.—Graphite ladle plastic firebrick.

GREEN BOND—Federal Foundry Supply Co.—Bentonite.

GREEN VELVET—Thiem Products Inc.—Mudding compounds.

GREENCAST-12—A. P. Green Fire Brick Co.—Castable refractory.

GREENCOTE—A. P. Green Fire Brick Co.—Maintenance coating and ladle wash.

GREENE—Greene Electric Furnace Co.—Arc melting furnaces.

GREFCO—General Refractories Co.—Sillimanite brick.

GRID—D. J. Murray Mfg. Co.—Unit heater.

GRINDLEMELT—Grindle Corp.

GRIT-CLOTH—Bay State Abrasive Products Co.—Sanding fabric.

GROG-O-MIX—A. P. Green Fire Brick Co.—Investment molding grog.

GROMMET—B. F. Goodrich Rubber Mfg. Co.—V-belts.

GROOVESTEM—Fanner Mfg. Co.—Chaplets.

GROOVLOCK—Fremont Flask Co.—Foundry flask pins.

GRUNDITE—Illinois Clay Products Co.—Bonding clay.

GUN RAM NO. 80—Ramtite Co.—Air-setting gunning material.

GUNDOL—Basic Refractories Inc.—Basic gun refractory.

GUNITE—Cement Gun Co.—Refractory applied by a Cement Gun.

GUNMIX—Basic Refractories Inc.—Basic gun refractory.

GUNPATCH—Pyro Refractories Co.—Supergum refractory.

GYRA-SCREEN—Beardsley & Piper Div.—Vibratory screen.

GYROCENTRIC—Patterson Foundry & Machine Co.—Screens.

GYRO-FLO—Ingersoll-Rand Co.—Portable air compressor.

GYROL—American Blower Corp.—Hydraulic couplings.

GYROSET—Productive Equipment Co.—Foundry shakeouts and core knockouts; vibrating screens.

H

H & G—St. Louis Coke & Foundry Supply Co.—Sand facings; partings; blackings; stabilizers; plumbago; core and mudding compounds; seacoal.

H & H—Carpenter Brothers Inc.—Tennessee and Indiana molding sand.

H & H—H & H Research Co.—Portable electric reciprocating action tools and accessories.

H & H—Northwestern Metal Co.—Brass and bronze alloy.

HBC—Hobart Bros.—Arc welding and generating equipment.

HT20—Asbury Graphite Mills Inc.—Noncarbonaceous exothermic pipe eliminator.

HTR—National Foundry Sand—Refractory castables and high-temperature cements.

H-W—Harbison-Walker Refractories Co.—Refractory castables.

H-W CHROME—Harbison-Walker Refractories Co.—Chrome brick.

H-W MAGNESITE—Harbison-Walker Refractories Co.—Magnesite brick.

HAISS—George Haiss Mfg. Co. Inc.—Car unloaders; conveyors.

HALO—United States Safety Service Co.—Face shield.

HAMILTON—Hamilton Tool and Machine Co.—Permanent molds; die casting dies.

HAMMERHEAD—Abrasive Metals Co.—Metal abrasive.

HAND REVO-TOOL—G. H. Tennant Co.—Chipping machine.

HANDEE—Chicago Wheel & Mfg. Co.—Portable electric tools.

HANDY-HANDY—Belt Corp.—Bulk materials conveyor.

HANDY SANDY—Newaygo Engineering Co.—Individual floor sand handling unit.

HANNA—Hanna Engineering Works—Air and hydraulic cylinders; electric solenoid and foot valves.

HANSEN—Hansen Mfg. Co.—Fluid line couplings.

HANSON—Hanson Clutch & Machinery Co.—Excavators; cranes; trailers.

HAPMAN—Hapman Conveyor Co.—Tubular conveyor for handling bulk materials.

HARCO—Haws Refractories Co.—High-fusion nozzles.

HARDLAC—McDougall-Butler Co. Inc.—Shellac type wood pattern coating.

HARRISON—Harrison Abrasive Division—Shot and grit.

HASKINS—R. G. Haskins Co.—Flexible shaft equipment for grinding, sanding, polishing, etc.

HAUCK—Hauck Mfg. Co.—Core oven burners; cupola lighters; ladle heaters; mold dryers.

HAUSFELD—Campbell-Hausfeld Co.—Melting furnace.

HAWS—Haws Refractories Co.—Fire clay and silica brick; special refractories.

HEALTHGUARD—Chicago Eye Shield Co.—Respirators.

HEATPROOF—Markal Co.—Protective anticorrosion paint.

HEAT PROVER—Cities Service Oil Co.—Portable furnace operation analyzer.

HEAT-REM—Speco Inc.—Heat-resistant paints.

HEAT RESISTANT—Acme Foundry Co.—Melting pots.

HEAT RITE—Continental Industrial Engineers Inc.—Furnaces.

HEATZONE—North State Pyrophyllite Co.—Refractory maintenance.

HEAVY DUTY—National Super Service Co.—Portable unit for dry cleaning.

HEAVY DUTY GYM—Empire Varnish Co.—Floor coating.

HELE-SHAW—American Engineering Co.—Pumps.

HELIARC—Linde Air Products Co.—Welding torches.

HELIWELDING—Air Reduction Sales Co.—Welding process.

HELLITE—Johns-Manville — Refractory cement.

HELSKOTE—Mexico Refractories Co.—Ingot stool coating.

HELSPOT—Mexico Refractories Co.—Plastic firebrick for metallurgical processes and ladle lining coating material.

HERCO—Karl A. Herman Co. — Adjustable duckboard; mold pallet dolly.

HERCULES—Leschen Wire Rope Div.—Wire rope.

HERCULES—Pacific Graphite Co. — Core paste.

HERCULES NVX—Hercules Powder Co. — Resin binder for improvement of green sand facings.

HERMAN—Herman Pneumatic Machine Co.—Molding machines.

HEROULT—American Bridge Div.—Electric melting furnace.

HEVI DUTY—Hevi-Duty Electric Co.—Heat treating furnaces; transformers.

HEVI-LIFT—Harnischfeger Corp. — Electric hoist.

HEX-TEX—Allis-Chalmers Mfg. Co.—Double V-belt for connecting oppositely rotating shafts.

HI LIFT—Baker-Raulang Co.—Fork lift truck.

HI QUALITY — Ingersoll Steel Div. — Molder shovels; eastern-type scoops.

HI TEMP GAN—National Foundry Sand—Ganister.

HIAC—General Refractories Co.—Super-duty firebrick.

HI-CARB STEEL—Alloy Metal Abrasive Co.—Abrasive blast materials.

HI-CAST—Denver Fire Clay Co.—Refractory castable.

HICYCLE—Chicago Pneumatic Tool Co. — Grinders.

HIDRY—White Pine Lumber Co. — Pattern lumber and plywood.

HIFIRE—Denver Fire Clay Co.—Firebrick.

HIFIRE BOND—Denever Fire Clay Co.—Refractory mortar.

HIGH DUTY—B. F. Goodrich Rubber Mfg. Co.—Water hose.

HIGH-CAPACITY GROMMET—B. F. Goodrich Rubber Mfg. Co.—V-belts.

HIGHFLEX—B. F. Goodrich Rubber Mfg. Co.—Air hose.

HI-GRADE—Clayton Sherman Abrasives Co.—Iron shot and grit.

HI-LIFT—Northern Engineering Works—Electric hoists.

HILLALLOY—Northwestern Metal Co.—High-strength aluminum alloy.

HILO-CHROME—Mexico Refractories Co. — Chrome-base bonding mortar.

HILOSET—Mexico Refractories Co. — High-temperature bonding mortar.

HI-RESIST—M. A. Bell Co.—Zircon-base core and mold wash.

HI-SPEED—Herman Pneumatic Machine Co.—Pitless type jar rollovers and draw molding machines.

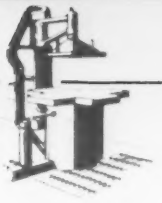
HI-TEMP—Delta Oil Products Co.—Wash.

HI-TEST—Steelblast Abrasives Co.—Shot and grit.

HOBART—Hobart Bros.—Arc welders, electrodes and accessories.

HOFFCOVAC—U. S. Hoffman Machinery Corp.—Portable industrial vacuum cleaners.

—For addresses of companies mentioned above, see list starting on page 184—



HOFFMAN—U. S. Hoffman Machinery Corp. —Stationary industrial vacuum cleaning systems; centrifugal blowers and exhausters.

HOLCROFT—Holcroft & Co.—Industrial heat treat furnaces.

HOLDTITE—Pittsburgh Metals Purifying Co. —High-temperature cement.

HOLINER—Martin Engineering Co.—Rubber blow plate bushing.

HOMER—Homer Mfg. Co.—Permanent magnetic separators.

HOMOCORD—Manhattan Rubber Mfg. Div.— Conveyor belts.

HOMOFLEX—Manhattan Rubber Mfg. Div.— Conveyor belts; hose.

HONITE—Minnesota Mining & Mfg. Co.— Barrel finishing chips, compounds and equipment.

HOT MATERIAL—B. F. Goodrich Rubber Mfg. Co.—Conveyor belting.

HOT SHOT—Scheu Products—Oil-burning portable heater.

HOTT PATCH NO. 31—Ramtite Co.—Heat-setting refractory mortar.

HOT-WORKERS'—American Optical Co.—Goggles.

HOUGHTO-CLEAN—E. F. Houghton & Co.— Metal cleaning compound.

HOUGHTO-GRIND—E. F. Houghton & Co.— Grinding additive for water.

HUNTINGTON—Collmer Brothers—Grinding wheel dressers.

HUSKIE—Mercury Mfg. Co.—Heavy-duty tractor.

HY BOND—Magee Brothers—Core oils.

HY TEMP REFRACTO—National Foundry Sand—Refractory lining materials for cupolas and electric furnaces.

HYDRAIR—Bellows Co.—Air-powered drill unit.

HYDRAMITE—American Engineering Co. — Pumps.

HYDRA-SLINGER—Beardsley & Piper Div.— Heavy-duty sandslinger with remote control.

HYDRA-SPRAY—Newcomb-Detroit Co. Inc.— Parts washers.

HYDROBLAST—Hydro-Blast Corp. — High-pressure water and sand blast equipment.

HYDROCAL—U. S. Gypsum Co.—Patternmaking material.

HYDROCAST—Chas. Taylor Sons Co.—Refractory concrete.

HYDROCAST—Hydropress Inc. — Die casting machine.

HYDRO-CENTRIFUGAL—Herman Pneumatic Machine Co.—Vertical centrifugal casting

HYDRO-CHECK—Bellows Co. — Hydraulic checking unit.

HYDRO-FILTE—R. C. Mahon Co. — Paint spray booth (water-wash).

HYDRO-FILTER—National Engineering Co.— Dust collector.

HYDRO-FINISH—Pangborn Corp. — Impact blasting equipment using an abrasive suspended in a liquid.

HYDRO-FOAM—R. C. Mahon Co.—Dust collector.

HYDRO-GUIDE—Haylco Controls Corp. — Foundry sand moisture controller.

HYDROHOOD—Hydro-Blast Corp. — High-pressure water, dust and fume collection systems.

HYDROLECTRIC—Lift Trucks Inc. — Handlead motorized lift trucks.

HYDROLIFT—Lift Trucks Inc.—Electric portable elevator.

HYDROMATIC—Lift Trucks Inc. — Multistroke lift trucks.

HYDROMITE—U. S. Gypsum Co.—Patternmaking materials.

HYDROMIXER—Pako Corp.—Chemical mixing and pumping unit.

HYDRO SAND-BLAST—Pangborn Corp. — Blast cleaning and core knockout equipment utilizing high-velocity stream of sand and water.

HYDROSCALE—Hydroway Scales Inc.—Hydraulic crane scale.

HYDROSET—A. P. Green Fire Brick Co.— Refractory castable.

HYDROSTONE—U. S. Gypsum Co.—Patternmaking and matchplate material.

HYDRYERS—J. F. Pritchard & Co.—Compressed air dehumidifier.

HYFUSE—White Rock Silica Sand Co.—Furnace bottom sand.

HYGEIA—Whitehead Bros. Co. — Seacoal; pitch; facing.

HYLO—Scheu Products—Oil-burning portable heater.

HYPEN CARB—Continental, Industrial Engineers Inc.—Carburizing equipment.

HYPERVAC—Central Scientific Co.—High-vacuum pump.

HY-SET—Mexico Refractories Co.—Heat-setting bonding mortar.

HYSTER—Hyster Co.—Materials handling equipment.

HY-TEN—E. F. Houghton & Co.—Core oil.

HY-TEST—International Shoe Co.—Safety shoes.

HY-TEST—New York Belting & Packing Co. —Steam hose.

HY-VAIR JET—De Bothezat Fans Div. — Axial flow jet fan.

HYVAC—Central Scientific Co.—High-vacuum pump.

I

I GRADE—M. A. Bell Co.—Plumbago and carbon base core wash.

I-R-C—Mexico Refractories Co.—Insulating castable refractory.

ICE-REM—Speco Inc.—Chemical ice and snow melting compound.

IDEAL—Ideal Chaplet Works—Chaplets.

IDEAL—Ideal Industries, Inc.—Portable blowers and cleaners.

IGNISOL—Frederic B. Stevens, Inc.—Ignitable or air-drying solvent carrier for core and mold coatings.

IGNITRON—Westinghouse Electric Corp.—AC to DC power rectifiers.

IMPERIAL—Pacific Graphite Co., Inc., Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Graphite core and mold wash.

IMPERIAL—Springfield Facing Co.—Liquid parting; sand blacking.

IMPERMO—General Electric Co. — X-Ray Dept.—Developing tanks and accessories.

IMPINGO FILTER — Mechanical Industries Inc.—Granule filter for dry continuous cleaning of hot, corrosive and wet gases.

IMPINGO WASHER — Mechanical Industries Inc.—Gas and air washer.

IMPREX—Tincher Products Div.—Metallic and plastic sealants.

INCO—International Nickel Co.—Nickel shot, squares, ingots.

INCONEL—International Nickel Co.—Nickel-chromium-iron alloy.

INDESTRUCTIBLE — New York Belting & Packing Co.—Conveyor belt.

INDIAN—Indianapolis Machinery & Supply Co.—Abrasion-resistant steel plate.

INDIAN HEAD—F. E. Schundler & Co. Inc. —Bentonite.

INDIANAPOLIS—Hickman, Williams & Co.— Foundry coke.

INDUCTOL — Archer-Daniels-Midland Co. — Core oil.

INDUSTRIAL—Industrial Equipment Co. — Ladles; bowls; shanks and tongs.

INDUSTRIAL—Industrial Metal Abrasive Co. —Metal abrasives.

INDUSTRIAL—Industrial Pattern Works — Wood and metal patterns.

INDUSTRIAL—Industrial Crane & Hoist Corp. —Overhead jib and gantry cranes.

INDUSTRIAL-AIR—Harvey P. Bertram Co.— Fans and ventilators.

INDUSTRIAL CHAMPIONS — Industrial Foundry Sales—Foundry flasks.

INERTEX—Foundry Services Inc.—Material to inhibit burning of magnesium.

INGOT KOTE—Thiem Products Inc.—Coatings.

INGOTHERM—Exomet Inc.—Exothermic material.

INSULATE No. 50 and No. 80—Ironton Fire Brick Co.—Light weight insulating castable.

INSULEX—C. R. Daniels Inc.—Hot-materials conveyor belting.

INSULKOTE—Johns-Manville — Ready-mixed coating for insulated surfaces.

INTERNATIONAL—International Graphite & Electrode Div.—Graphite electrodes.

INTERNATIONAL—International Engineering Inc.—Foundry mixing pans; exhaust fans; stack and duct fans; liquid mixers.

INTERNATIONAL—International Molding Machine Co.—Molding machines; core machines; sand blowers; special foundry machines.

INVINCIBLE—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Graphite core and mold wash.

IRON FILLER—M. A. Bell Co.—Iron casting defect filler.

IRON LUNG—Iron Lung Ventilator Co. — Roof ventilators.

IRON R 12—Foundry Services Inc.—Iron flux.

IRONTON—Ironton Fire Brick Co.—Cupola lining and patching.

ISOTRON—Gamma Corp.—Radiographic equipment for exposing cobalt or iridium radiation.

IT'S A HONEY—Richmond Glove Corp. — Work gloves.

J

J-M—Johns-Manville—Insulating firebrick and 85% magnesia insulation.

JACK RABBIT—Continental Industrial Engineers Inc.—Salt bath and conveyors.

JANITROL—Surface Combustion Corp.—Unit heaters.

JAY BEE—Mexico Refractories Co.—Superduty firebrick.

JECT-O-VALVE—Swartwout Co.—Industrial ventilators.

JEEP—Mercury Mfg. Co.—Fork truck 2000 lb capacity.

JEFFREY-TRAYLOR—Jeffrey Mfg. Co.—Vibrating feeders and conveyors.

JENNITE—Jennison-Wright Co.—Wood block floor coating.

JETBOND NO. 300—Swan-Finch Oil Corp.— Core oils.

JETLINER—Construction Machinery Corp.— Cupola lining pneumatic machines.

JIFFYBLAST—Pangborn Corp.—Aluminum oxide blasting abrasive for special uses.

JIMMY—Factory Service Co.—Mover for semi-live skid.

JISCO—Jackson Iron & Steel Co.—Silvery pig iron.

JOHNSON-MARCH—Johnson-March Corp. — Dust control systems; dust allaying and wetting compounds.

JOHNSTON—Johnston Mfg. Co.—Melting furnaces; heat treating furnaces; heating torches; ladle heaters; burners, blowers and controllers.

JOINT SEAL—Whitehead Bros. Co.—Seal for flask joints.

JUBILEE—New York Belting & Packing Co. —General purpose and air hose.

JUNIATA—Great Lakes Foundry Sand Co.— Bank sand.

JUNIOR—Babcock & Wilcox Co.—Firebrick.

JR. NITE GANG—Beardsley & Piper—Portable sand conditioning and preparation device that is not self-loading and self-propelling.

JUPITER—B. F. Goodrich Rubber Mfg. Co.— Water hose.

K

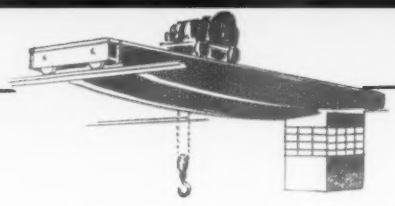
K-11 RAMMING MIX — Walsh Refractories Corp.—Plastic refractory.

KD-2—A. P. Green Fire Brick Co.—Air-setting refractory mortar.

KX-99—A. P. Green Fire Brick Co.—Superduty firebrick.

—For addresses of companies mentioned above, see list starting on page 184—

TRADE NAMES



K.A.K.—Asbury Graphite Mills, Inc.—Shake-on facing.

K-B—Logan Co.—Spiral chutes.

K & B—Kirk & Blum Mfg. Co.—Dust and fume control equipment.

K-G—K. G. Equipment Co. Inc.—Welding, cutting and heating equipment.

K & R—Kane & Roach Inc.—Rod straightening machines.

K BRAND—S. Obermayer Co.—Core paste.

KAISER — Kaiser Aluminum & Chemical Corp.—Aluminum pig, ingot and billet.

KAL-TRUK—Kalamazoo Mfg. Co.—Bulk material handling truck.

KANISTER-KIT—B. F. McDonald Co.—First aid kit.

KAOCAST—Babcock & Wilcox Co.—Refractory castable.

KAOLIN—General Refractories Co.—Fireclay brick.

KARBO—Keystone Refractories Co.—Refractory ganister.

KARRI-GO—Silent Hoist & Crane Co.—Mobile front-boom crane.

KAST KLEEN KOMPOUND — Frederic B. Stevens Inc.—Facing sand additive.

KAST-O-LITE—A. P. Green Fire Brick Co.—Insulating castable refractory.

KAST-SET—A. P. Green Fire Brick Co.—Castable refractory.

KATHABAR — Surface Combustion Corp. — Cupola blast dehumidifier.

KEFRAKTO—Keystone Refractories Co.—Refractory sand.

KELLER—Keller Tool Co.—Air hoists; pneumatic tools.

KELLOGG—Electro Refractories & Abrasives Corp.—Silicon carbide brick.

KELLOGG-AMERICAN—American Brake Shoe Co.—Air compressors; paint spray equipment.

KELLUNDITE—Electro Refractories & Abrasives Corp.—Bonded corundum refractory brick and ramming mix, high alumina.

KELVINATOR—Ebco Mfg. Co.—Electric water coolers.

KEMSET—Hill & Griffiths Co.—Chemical setting core paste.

KEOKUK ALLOY—Keokuk Electro-Metals Co.—High-silicon pig iron with varying percentages of chrome, nickel and manganese.

KEOKUK ELECTRO-SILVERY—Keokuk Electro-Metals Co.—Silvery pig iron 14% to 25% silicon content.

KEOKUK METAL — Keokuk Electro-Metals Co.—Silicon metal and various grades of ferrosilicon.

KEYSTONE—Keystone Abrasive Wheel Co.—Abrasive products.

KIMBALL—Kimball Bros. Inc.—Freight and passenger elevators.

KING BEE—Richmond Glove Corp. — Work gloves.

KING KORE KOMPOUND — Frederic B. Stevens Inc.—Pitch-base facing sand additive.

KLEANFAST—Geo. M. Pendergast & Co.—Sandblast sand.

KLEAN KORE—Manley Sand Co.—Dried lake sand.

KLENKORE—Carpenter Brothers Inc.—Indiana lake sand.

KLEN ZINC—Pittsburgh Metals Purifying Co.—Flux for zinc-base die castings.

KNEADERMASTER — Patterson Foundry & Machine Co.—Heavy-duty mixing machines.

KNIGHT-MODELS—Lester B. Knight & Associates Inc. — Three dimensional scale models.

KODAK—Eastman Kodak Co.—Industrial x-ray film.

KO-KNEADER—Baker-Perkins Inc.—Continuous core and molding sand mixers.

KOLENE—Kolene Corp. — Casting cleaning equipment and chemicals.

KOLMAN — Kolman Mfg. Co. — Vibrating screens; belt conveyors.

KOOL-GRIP—Industrial Gloves Co.—Asbestos gloves.

KOOLHEAD—Standard Horse Nail Corp.—Foundry chill nails and spider chills.

KORBOND—United Oil Mfg. Co.—Core oil.

KORDEK—Corn Products Refining Co.—Cereal binder.

KORDELL—Kordell Industries—Core oils; corrosion-resistant coatings; cut wire shot.

KORECREAM—Hill & Griffiths Co. — Resin core compounds.

KORELINE—M. A. Bell Co.—Plumbago-base core wash.

KORFAST—Frederic B. Stevens Inc. — Core paste.

KORGLAZE—United Oil Mfg. Co.—Core and mold wash.

KORITE — Pennsylvania Foundry Supply & Sand Co.—Core paste.

KORO—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Graphite core and mold wash.

KOR-RITE—Metro-Nite Co.—Dry resin type core binder.

KORWELD—Foundries Materials Co. — Core paste.

KOVER MORE—Willson Products Inc.—Safety goggle.

KRANE KAR—Silent Hoist & Crane Co.—Mobile swing-boom crane.

KREOLITE—Jennison-Wright Co.—Wood block flooring.

KROMEBOND—General Refractories Co. — High-temperature chrome mortar.

KROME KOTE—Thiem Products Inc.—Core washes.

KROME-KOTE — Wolfe-Kote Co. — Rust remover.

KROMOVER—All-State Welding Alloys Co.—Tinning and galvanizing pencil.

KRUZITE—A. P. Green Fire Brick Co.—70% alumina firebrick.

KUIK KORE KOMPOUND—M. A. Bell Co.—Dry core binder.

KUT-STEEL—Steelblast Abrasives Co. — Cut wire shot.

KUX—Kux Machine Co.—Die casting machines.

L

L-900—Rezolin Inc. — Non-shrink laminating resin.

L. O. — Smith Oil & Refining Co.—Core oil; liquid parting and rod dip.

LWC NO. 73—Ramtite Co. — Light-weight castable refractory.

L METAL—Molybdenum Corp. of America—Misch metal.

LAB-METAL—Alvin Products Inc.—Moldable metal.

LAB-PATCH—Alvin Products Inc.—Plastic impregnated fabric backing material for metal repairs. Used in conjunction with Lab-Metal.

LAB-SOLVENT—Alvin Products Inc.—Thinner and reactivator for Lab-Metal.

LADLE MIX—North State Pyrophyllite Co.—Ladle lining.

LAN CER AMP—American Metallurgical Products Co.—Rare earth metal, misch metal or cerium metal.

LANCASTER—Posey Iron Works Inc.—Sand muller-mixer.

LANLY—Lanly Co.—Core and mold ovens.

LATITE—Denver Fire Clay Co.—Refractory mortar.

LAVA—Lava Crucible Co. of Pittsburgh—Graphite and silicon carbide crucibles.

LAVALLOY—Lava Crucible Co. of Pittsburgh—Mullite fused alumina refractories, cements.

LAVALOX—Lava Crucible Co. of Pittsburgh—Fused alumina refractories, cements.

LAVIN—R. Lavin & Sons Inc.—Nonferrous metals and alloys.

LAV-O-BOND—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Sand bond and rejuvenator.

LEAHY—Deister Concentrator Co.—Heavy-duty vibrating screen.

LEAK-O-METER — Tincher Products Div.—Quantitively measures leaks in pressure castings.

LECO—Laboratory Equipment Co.—Laboratory combustion furnaces (induction and globar types); carbon analyzers; sulphur analyzers.

LECTRODRYER—Pittsburgh Lectrodryer Co.—Dryers for air and gases.

LECTROFILTER—Pittsburgh Lectrodryer Co.—Filter for air and gases.

LECTROMELT — Pittsburgh Lectromelt Furnace Corp.—Arc type electric melting and refining furnaces.

LECTRO-PAT—Cleveland Electro Metals Co.—Pattern alloy.

LEECOTE—Leeco Corp.—Mold and core coatings.

LEEK-PRUF—Combined Supply & Equipment Co.—Foundry chaplets.

LEHIGH—Lehigh Safety Shoe Co. — Safety shoes.

LEPRO—Leschen Wire Rope Div.—Wire rope lubricant.

LESCHEN—Leschen Wire Rope Div. — Wire rope.

LESTER—Lester Engineering Co.—Die casting machines.

LEVERLIFT—Service Caster & Truck Co.—Hydraulic hand truck.

LEW—Lippmann Engineering Works — Bench and pedestal grinders; conveyors.

LEWIS-HYDRA-LOCK — Die casting machine for aluminum, magnesium.

LIBERTY—M. A. Bell Co.—Pattern release liquid.

LIFEGUARD—Ross Operating Valve Co.—Safety control valve.

LIFE-LINE — Westinghouse Electric Corp. — Electric motors.

LIFTABOUT JUNIOR—Shepard Niles Crane & Hoist Corp.—Electric hoist.

LIFT-O-KRANE—Silent Hoist & Crane Co.—Combination crane, lift and ram truck.

LIFTRUK—Silent Hoist & Crane Co.—Heavy-duty fork lift trucks.

LIGHTNIN MIXERS—Mixing Equipment Co.—Industrial fluid mixing equipment.

LIMA—Lima Locomotive Works—Cranes and shovels.

LIMECREST—Debevoise-Anderson Co. Inc.—Fluxing limestone.

LIMITATOR—Pekay Machine & Engineering Co.—Bin level controller.

LINAFLEX—Pangborn Corp. — Abrasive resisting rubber sheet lining.

LINBOND—United Oil Mfg. Co.—Core oil.

LINCO — Buckeye Products Co. — Core compound.

LINCOLN — Northwestern Metal Co. — Aluminum alloy.

LINDBERG-FISHER — Lindberg Engineering Co.—Metal melting and holding equipment.

LINDE—Linde Air Products Co.—Industrial gases, sigma welding equipment; silicone release agents; insulating resins.

LINESTARTER—Westinghouse Electric Corp.—Electric motor starters.

LINK-BELT—Link-Belt Co.—Sand, mold and casting handling equipment; chains; shake-outs; conveyors and power transmission machinery.

LIN-O-CEL — Archer-Daniels-Midland Co. — Sand stabilizer.

LINOFLAME—Maxon Premix Burner Co.—Burner.

LINOIL—Archer-Daniels-Midland Co. — Core oil.

LINSEAL—Buckeye Products Co.—Core oil.

LIQUAMATTE — American Wheelabrator & Equipment Corp.—Wet blasting machines.

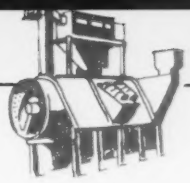
LIQUI-PART—Frederic B. Stevens Inc.—Spray-on pattern release.

LIQUI-PLASTIC—Wellman Products Co.—Cold glue for patterns.

LIQUID—Liquid Carbonic Corp.—Arc welding equipment.

LIQUID LONGER—Exothermic Research Products Inc.—Moldable exothermic material for riser sleeves.

LIQUID RISER—Exothermic Research Products Inc.—Exothermic riser compound for ferrous and nonferrous metals.



LIQUITOL—Alpha-Lux Co.—Anti-piping compound for iron and steel castings.

LITE-ROCK—Cleveland Gypsum Co.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

LITEWATE—E. J. Woodison Co.—Parting.

LITTLE GIANT—Little Giant Products Inc.—Hand winches, rotary sweepers.

LOAD-GRAP—Hyster Co.—Palletless handling attachment.

LOAD LIFTER—Manning, Maxwell & Moore, Inc.—Hoists and cranes, hand and electric.

LOAD LIFTER JR. — Manning, Maxwell & Moore, Inc.—Light-duty hoists.

LOAD LUGGER—Brooks Equipment & Mfg. Co.—Hydraulic hoist for trucks.

LOAD-O-MATIC—Westinghouse Electric Corp. —Electric crane controls.

LOAD-PLUS—Jaeger Machine Co.—Front end loader.

LOCK-TITE—Eclipse Fuel Engineering Co.—Safety shut-off gas valves.

LOCKERBASKET—Moore Co.—Container for overhead storage of workers' clothing.

LOFTUS—Loftus Engineering Corp.—Melting and heat treating furnaces.

LOGAN—Logan Co. — Roller, belt, apron, pusher-bar, wheel and trolley conveyors; chutes.

LONGLIFE—B. F. Goodrich Rubber Mfg. Co. —Conveyor belting.

LO-HEAD—American Engineering Co.—Electric hoist and car pullers.

LO-SET—Mexico Refractories Co.—Air-setting bonding mortar.

LOUDEN—Louden Machinery Co. — Overhead material handling systems.

LOW-HEAD—Allis-Chalmers Mfg. Co.—Horizontal inertia type vibrating screens and gyratory sifters.

LOWE—Federal Foundry Supply Co.—Sand sifter.

LUBRIGUNS — Lincoln Engineering Co. — Power-operated lubricant drum pumps.

LUCY JANE—MacLeod Co.—Torches for drying molds and cores.

LUDINGTON—Sargent Sand Co.—Sharp lake sand.

LUMNITE—Universal Atlas Cement Co.—Cement for refractory, heat and corrosion resistant, insulating concretes.

LUNGS FOR INDUSTRY—General Blower Co.—Fans; blowers; exhausters; power roof ventilators; turbo-blowers.

LUXIT—Alpha-Lux Co.—Refractory mixes for ladle linings, tap-holes, spouts and furnace repairs.

LYCOPART—Frederic B. Stevens Inc.—Shake-bag parting for ornamental and fine detail work.

LYNTRON—Monsanto Chemical Co. — Sand conditioner.

LYQUAFACE—Whitehead Bros. Co.—Sand additive.

LYQUAFLOUR—Whitehead Bros. Co. — Sand additive.

LYQUAGRIP—Whitehead Bros. Co. — Core paste.

M

M-5, M-11—Mexico Refractories Co.—Insulating firebrick mortar.

M-26, M-23, M-20—Mexico Refractories Co.—Insulating firebrick.

MBI HIMELT—Magee Brothers — High-temperature greases.

MCA—Molybdenum Corp. of America—Ferro-molybdenum; molybdenum oxide and powder.

MCK-ALLOY—McKay Co.—Sling chain with foundry hooks attached.

MG—North American Philips Co.—Industrial radiographic equipment.

MGC—Hobart Bros.—Battery chargers; generators.

M-H—Miner-Hillard Milling Co.—Cereal core binder.

ML—Machlett Laboratories Inc. — Electronic tubes for dielectric heating.

MM-Minneapolis-Moline Co.—Wheel type loaders, internal combustion engines.

M-T-MATIC—Pekay Machine & Engineering Co.—Self-cleaning elevator bucket.

MV—Jeffrey Mfg. Co.—Mechanical vibrating conveyor.

MX—Carborundum Co.—Abrasive wheels and sticks.

MX-80—Carpenter Brothers Inc. — Western bentonite.

MABCO—M. A. Bell Co.—Washes; core oils; mold and core bonds; fluxes; pattern paint; pitch reviver; core oil accelerator; aluminum plastic.

MABCOTHERM—M. A. Bell Co.—Exothermic antipiping compound.

MAB-PRO—M. A. Bell Co.—Combination sand addition.

MACK-FLEX—Macklin Sales Co. — Flexible grinding wheels.

MACKLIN — Macklin Sales Co. — Grinding wheels.

MACLEOD—MacLeod Co.—Oil burners; blacking swab sprayers; swab guns.

MACWHYTE—Macwhyte Co.—Pre-formed wire rope.

MAGAMP—Westinghouse Electric Corp.—Electric current regulators.

MAGAVAC — Central Scientific Co. — High-vacuum pump.

MAGIC GRIP—Allis-Chalmers Mfg. Co.—V-belt sheaves and bushings.

MAGNAFLO—Allis-Chalmers Mfg. Co.—Electric vibrating screens and feeders.

MAGNAFLUX—Magnaflux Corp. — Magnetic particle inspection.

MAGNAGLO—Magnaflux Corp. — Fluorescent, magnetic particle inspection.

MAGNALINE—Electro Refractories & Abrasives Corp. — Ramming mix, basic-fused magnesia.

MAGNALUM—Pittsburgh Metals Purifying Co. —Aluminum and magnesium flux.

MAGNARATOR — Beardsley & Piper — Small screening and sand conditioning device.

MAGNAVATOR—Prab Conveyors Inc.—Magnetic elevator.

MAGNEHARTH—General Refractories Co.—Basic ramming material.

MAGNETOOL—Carpenter Brothers Inc.—For pickup of metal abrasive.

MAGNETOOL—Multi Finish Mfg. Co.—Permanent magnet tools.

MAGNEX—Harbison-Walker Refractories Co. —Magnesite brick.

MAGNORITE—Norton Co.—Refractories.

MAGNOSPALL—Electro Refractories & Abrasives Corp.—Magnesite refractory brick.

MAHR—Mahr Mfg. Division—Heat treating furnaces.

MAIDEN ROCK—Wehenn Abrasive Co.—Sand blast sand.

MAIN—Main Belting Co.—Heat-resistant conveyor belting.

MAIN OIL BUFF—Main Belting Co.—Sand conveyor belting.

MALKOLUBE—Westinghouse Electric Corp.—Heat-resisting lubricants.

MALL—Mall Tool Co. — Flexible shaft machines.

MALLAN STEEL—Globe Steel Abrasive Co.—Blast cleaning abrasive.

MALLEABRASIVE—American Steel Abrasives Co., Globe Steel Abrasive Co., Pittsburgh Crushed Steel Co.—Shot and grit.

MALTESE CROSS—Hewitt-Robins Inc.—Conveyor belting.

MANGANAL—Stulz-Sickles—Abrasion-resistant welding products.

MANHATTAN—Manhattan Rubber Mfg. Div. —Abrasive wheels.

MANNING—Manning Pattern Co.—Patterns.

MAN-O-STEEL—Michigan Crane & Conveyor Co.—Heat treat furnace loader.

MANSILOY—Electro Metallurgical Co.—Manganese-silicone alloy.

MAQUOKETA—Maquoketa Co. — Front-end loader.

MARBLETTE RESIN No. 71—Marblette Corp. —Resin for casting patterns and matchplates.

MARIETTA—Marietta Concrete Corp. — Precast concrete stave silos or bins.

MARINITE—Johns-Manville — High temperature insulation.

MARQUETTE—Marquette Mfg. Co.—Welders; electrodes; oxy-acetylene welding and cutting equipment.

MARSCHKE—Polishing & Grinding Machinery —Grinders.

MARSHALL—L. H. Marshall Co.—Thermocouple for measuring temperature of nonferrous metals.

MARVEL—Boyer Campbell Co. — Grinding wheel shields.

MASCO—Manley Sand Co.—Bank sand.

MASCON—Masonite Corp.—Sand conditioner, cereal extender and replacement.

MASONEX—Masonite Corp.—Liquid core binder and core oil extender.

MASONOID—Masonite Corp.—Dry core binder; core oil extender.

MASTER—Master Pattern Co.—Patterns, permanent molds.

MASTERMIX—Foundries Materials Co.—Core and mold wash.

MASTERPLATE—Master Builders — Metallic hardener for new and old concrete floors.

MASTER POWER—Master Pneumatic Tool Co.—Portable air tools.

MASTERQUICK — Master Builders — Iron-asphalt material for patching concrete floors.

MATCHLESS—Chisholm-Moore Hoist Corp.—I-beam monorail trolley.

MATHEWS—Mathews Conveyor Co.—Conveyors.

MAX—Max Mfg. Co.—Disk sanders; abrasive belt grinder.

MAX-BOND—Mexico Refractories Co.—High strength super-duty plastic.

MAXECON—B. F. Goodrich Rubber Mfg. Co. —Air hose; water suction water hose; conveyor belting.

MAXIMUM SERVICE—Sermax Corp. — Core baking, paint baking, horizontal conveyor and vertical conveyor ovens; special heating equipment.

MAXISERVICE—General Electric Co., X-Ray Dept.—X-ray apparatus rental plan.

MAY-FRAN — May-Fran Engineering Inc. — Hinge-type steel belting.

MAZDA—General Electric Co., Schenectady— Lamps.

McCANN—Foundry Equipment Co.—Heat treat furnaces.

MECHANOPRINT—Howe Scale Co.—Mechanical weight recorder.

MECHETA—Aerovent Fan Co.—Airfoil axial flow fans.

MECO—Modern Engineering Co.—Welding and cutting equipment and supplies; brazing flux.

MEEHANITE—Meehanite Metals—Foundry operation and metallurgical service.

MELTRITE—Pickands, Mather & Co.—Pig iron.

METALAST — Elematic Equipment Corp. — Thermocouple protection tube.

METALEX — Exothermic Research Products Inc.—Exothermic slag riser compound for iron and steel.

METALIZED—Eclipse Fuel Engineering Co.— Pressed steel pots.

METALKASE — Harbison-Walker Refractories Co.—Magnesite brick.

METALLOY—Metalloy Corp.—Lithium copper cartridges.

METALMASTER—Bradford Machine Tool Co. —Lathes; pedestal model buffers and grinders; portable electric tools.

METALTITE—Laclede-Christy Co. — Brick mortar for malleable and steel furnaces, ladles.

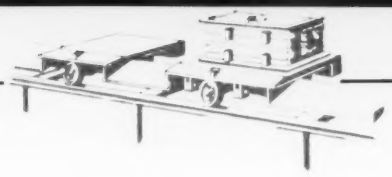
METCO—Metallizing Engineering Co.—Metal spray metallizing equipment.

METEOR—Chisholm-Moore Hoist Corp.—Electric hoist.

METRO-KORE—Metro-Nite Co. — Dry resin type core binder.

MEX—U. S. Graphite Co.—Graphite ingot mold wash.

TRADE NAMES



MEXADIP—U. S. Graphite Co.—Core wash; foundry facing.

MEXALOY—U. S. Graphite Co.—Refractory ingredient.

MEXATOP—U. S. Graphite Co.—Hot topping compound.

MEXICAST—Mexico Refractories Co.—Plastic refractory concrete.

MEXITE—U. S. Graphite Co.—Briquets for raising carbon in cupola charges.

MEX-KO—A. P. Green Fire Brick Co.—Superduty firebrick.

MEX-LOX—Mexico Refractories Co.—Jointing mortar.

MICALITE—Induction Heating Corp.—Plastic cast and molded parts.

MICHIGAN — Constructions Machinery Div., Clark Equipment Co.—Crawler and truck mounted cranes, magnet cranes and clamshells.

MICHIGAN—Michigan Crane & Conveyor Co. —Overhead traveling bridge cranes, conveyors and other materials handling equipment.

MICROMAX — Leeds & Northrup Co. — Recorders and controllers, electro-mechanical.

MICROSIL—Standard Silica Corp. — Ground silica sand or flour.

MIDGET—Metzgar Co.—$\frac{3}{4}$-in.-diam. roller.

MIDGET IMPINGER—Mine Safety Appliances Co.—Portable dust sampling instrument.

MIDGET MILLS—Severance Tool Industries Inc.—Burrs; rotary files.

MID-WEST—Mid-West Abrasive Co.—Grinding wheels; coated abrasives; abrasive grain; sharpening stones.

MIGHTY MIDGET—Pangborn Corp. — Small portable blast unit.

MIGHTY MIDGET—Coffing Hoist Co.—Belt puller for maintenance work.

MILL-CRETE—Mexico Refractories Co.—Refractory castable.

MILLER—Miller Fluid Power Co.—Air and hydraulic cylinders; boosters; accumulators; counterbalance cylinders.

MILLER-WELLMAN—Wellman Products Co. —Corebox machine.

MILLINGTON—Sargent Sand Co.—Fine bank sand.

MILLITE—Westinghouse Electric Corp.—High bay luminaires.

MILLVILLE—Carpenter Brothers Inc.—New Jersey Molding sand.

MILWAUKEE—Milwaukee Foundry Equipment Div.—Molding machines; core grinders; briqueting presses.

MILWAUKEE—Rice Pump & Machine Co.— Die filers; profile grinders.

MILWAUKEE SOLVAY—Pickands, Mather & Co.—Foundry coke.

MILWAUKEE-TACCONE — Taccone Pneumatic Foundry Equipment—Core blower.

MILWAUKEE-TESSMER—Rice Pump & Machine Co.—Sprue cutters.

MILWAUKEE THREAD STEM — Milwaukee Chaplet & Mfg. Co.—Chaplets.

MINCO BOND—Minco Products Corp.—Molding sand bond and stabilizer.

MINERVA—Hickman, Williams & Co.—Fluorspar concentrate.

MITI-MITE—Harnischfeger Corp. — Truck crane.

MIXCO—Mixing Equipment Co.—Fluid mixing engineers.

MIXER-MULLER—Pekay Machine & Engineering Co.—Sand conditioning unit.

MIZZOU—A. P. Green Fire Brick Co.—60% alumina firebrick.

M.L.B.—Milwaukee Leather Belting Co. — Leather belting.

MOBILCRANE—Osgood General—Yard material handler.

MOCO—Michigan Oven Co.—Industrial ovens.

MODERN—Hill & Griffiths Co.—Graphite core and mold wash.

MODERN—St. Louis Coke & Foundry Supply Co.—Mold and core blackings.

MODERN—Modern Equipment Co.—Cranes; cupolas; chargers; pouring devices; charging buckets; hot blast.

MODINE—Modine Mfg. Co.—Unit heaters.

MOGUL—Metallizing Co. of America—Metallizing guns; quench arc weld machines and dot weld pistols; pressure machines for testing and impregnating porous pressure castings; impregnating material.

MOGUL—Corn Products Refining Co.—Cereal binder.

MOGULLIZERS—Metallizing Co. of America—Vacuum-pressure machines for batch impregnating porous pressure castings.

MOLD LITE—Thiem Products Inc. — Mold sprays.

MOLDCOATS—Foundry Services Inc. — Mold wash.

MOLDOCHIL—Capewell Mfg. Co. — Foundry chill nails.

MOLD-RITE—Combined Metals Reduction Co. —Mineral perlite for use as sand addition, riser insulation and ladle cover.

MOLD-RITE — Hardy Sand Co. — Core and molding sands.

MOLDUKO—Superior Flake Graphite Co. — Core and mold wash.

MOLLOY—Patterson Foundry & Machine Co.— Steel grinding balls.

MONARCH—Macwhyte Co.—Wire rope.

MONARCH—Pacific Graphite Co. Inc.—Tripoli parting.

MONEL—International Nickel Co. — Nickel-copper alloy.

MONELITE—Dockson Corp. — Goggles; dust mask.

MONK—Monk Tool Co.—Molders' tools.

MONKEY GRIP—Edmont Mfg. Co.—Plastic-coated glove.

MONO-CAST—Ramtite Co.—Air-setting castable refractory

MONO-CHROME—Mexico Refractories Co. — Chrome-base plastic firebrick.

MONO-FIBRIK — Mexico Refractories Co.— Plastic firebrick.

MONOGAS—Westinghouse Electric Corp.—Gas atmosphere generators for metal treating furnaces.

MONO-ROLL—National Engineering Co. — Train type mold conveyor.

MONOTRACK—Louden Machinery Co.—Monorail track.

MONOTRACTOR—American Monorail Co.— Power drive for horizontal propulsion.

MONOWELD—All-State Welding Alloys Co.— Welding electrodes.

MONROE—Monroe Sales Corp. — Industrial trucks.

MOORE—Chisholm-Moore Hoist Corp. — I-beam monorail trolley.

MO-REX—Mexico Refractories Co.—First quality, dry press, firebrick.

MORT-AIRSET—Walsh Refractories Corp.— Refractory mortar.

MORTON—Morton Salt Co.—Salt tablets.

MOTO-BUG—Kwix-Mix Div.—Power wheelbarrow.

MOTOCABS—Louden Machinery Co.—Monorail drive unit.

MOTOCYLINDERS — Westinghouse Electric Corp.—Workhandling equipment.

MOTOR-WATCHMAN—Westinghouse Electric Corp.—Electric motor starting switches.

MOTO-TROLLEY—Industrial Crane & Hoist Corp.—Motorized monorail trolley.

MOTO-TRUC—Moto-Truc Co.—Industrial electric trucks.

MOTOVEYORS — Louden Machinery Co. — Monorail drive unit.

MOULDERS' FRIEND—The Moulders' Friend —Portable sand conditioner.

MOWO—Willson Products Inc.—Plastic goggle.

MOYNO—Robbins & Myers Inc.—Pumps.

MULBARO—Beardsley & Piper Division — Small portable batch type mullor.

MULLBOND—Mullite Refractories Co.—Mullite mortar.

MULLCAST—Mullite Refractories Co.—Mullite castables.

MULLCOAT—Mullite Refractories Co.—Mullite core wash.

MULLER MIXER—Muller Machinery Co.— Core sand mixer.

MULLFRAX—Carborundum Co. — Refractory brick, tile, shapes and cements.

MULLITEX—Walsh Refractories Corp.—Fire brick.

MULLPATCH—Mullite Refractories Co.—Mullite patching mixes.

MULLRAM—Mullite Refractories Co.—Mullite rammed monolithic linings for furnaces, ladles and cupola spouts.

MULLTROL—Beardsley & Piper Division— Simplified sand mulling timing control.

MULLTROLMATIC—Beardsley & Piper Division—Timer system for controlling sand mulling cycle.

MULTILIFT—Multi Finish Mfg. Co.—Releasing hand magnet.

MULTI-LUBER — Lincoln Engineering Co. — Centralized lubricating system.

MULTIPLE UNIT—Hevi-Duty Electric Co.— Laboratory furnaces.

MULTI-RATIO—Maxon Premix Burner Co.— Air-gas proportioning unit.

MULTI-TABLE — American Wheelabrator & Equipment Corp. — Airless abrasive blast cleaning machines.

MULTI-TABLE—Pangborn Corporation—Blast cleaning machines with multiple revolving tables.

MULTI-VANE—Ingersoll-Rand Co.—Vane-type air motors.

MULTI-WASH—Claude B. Schneible Co.—Wet type dust collector.

MUREX—Metal & Thermit Corp.—Arc welding electrodes.

MURPHY—Jas. A. Murphy & Co. Inc.—Pistol sprayer; air line aftercooler; combination aftercooler and separator.

MUSE—S. Obermayer Co.—Roll blacking; ingot mold blacking; chill roll blacking.

MUSKEGON—Nugent Sand Co. Inc.—Foundry sands.

MYSTIC—New England Coke Co.—Pig iron.

N

NCC—International Nickel Co.—Nickel-copper-chromium iron pig.

NCG—National Cylinder Gas Corp.—Industrial gases.

NFA—American Optical Co.—Safety goggles.

N. H.—International Nickel Co.—Nickel-chromium-iron pigs.

NARLO—Hickman, Williams & Co.—Dolomitic fluxing limestone.

NATCO—National Pigment Co. Inc.—Hot-topping compound for ingots, risers and in ladles.

NATIONAL—S. Obermayer Co. — Iron filler cement.

NATIONAL—National Crucible Co.—Graphite crucibles; silicone-carbide and mullite crucible linings; covers and cements.

NATIONAL—Baroid Sales Division—Bentonite.

NATIONAL—National Carbon Co. Inc.—Carbon electrodes; carbon and graphite products.

NATIONAL—National Engineering Co.—Sand, mold, casting conveyors; sand reclamation equipment.

NATIONAL—National Pulverizing Co.—Silica sand; silica flour; blasting sand.

NATURAL FREQUENCY—Carrier Conveyor Corp.—Conveyors and feeders.

NEOX—Edmont Mfg. Co. — Neoprene-coated glove.

NERCO — Nichols Engineering & Research Corp.—Foundry sand reclamation equipment.

NEVILLE—Pittsburgh Coke & Chemical Co.— Pig iron.

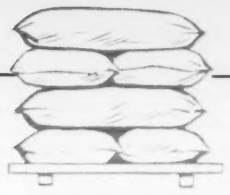
NEW ENGLAND—New England Coke Co.— Foundry and metallurgical coke.

NEWAYGO—Newaygo Engineering Co.—Sand handling and conditioning systems.

NICHOLLS—Wm. H. Nicholls Co.—Molding machines.

NI-ROD—International Nickel Co.—Welding rod.

NISILOY—International Nickel Co.—Gray iron inoculant.



NITE GANG—Beardsley & Piper Division—Self-loading, self-propelling sand blending and conditioning machine.

NITROX—Solvay Process Division—Rust preventive and cleaner.

NOCK—Nock Fire Brick Co.—Refractories.

NO DRI—Thiem Products Inc.—Mold sprays.

NODULOY—Vanadium Corp. of America—Alloy for producing nodular iron.

NO-DUST—Hammond Machinery Builders—Grinders.

NOJOINT—Ironton Fire Brick Co.—Plastic firebrick for ladle linings, spouts, cupola patching.

NOMAD—Westover Engineers—Conveyor systems.

NONFERROUSKOAT—Delta Oil Products Co.—Wash.

NON-FLUID OILS—New York & New Jersey Lubricant Co.—Lubrication for all types of foundry equipment.

NON-GRO—Electro Refractories & Abrasives Corp.—Silicon carbide brick.

NOPAK—Galland-Henning Mfg. Co.—Air and hydraulic operating valves.

NORBIDE—Norton Co.—Pressure blast nozzles; metallurgical compound.

NORBLO—Northern Blower Co.—Dust arresters; fans; blowers; hydraulic washers.

NORTHERN—Northern Engineering Works—Overhead traveling cranes.

NORTHERN BOND—Minco Products Corp.—Western bentonite.

NO-VEIN COMPOUND—Delta Oil Products Co.—Core sand plasticizing material.

NOVIWELD—American Optical Co.—Lenses and plates.

NORWALK-WHITING—Norwalk Valve Co.—Cupola back-pressure valve; cupola windbox vent.

NORWAY—Manley Sand Co.—Dried and screened naturally bonded molding sand.

NU-MATIC—Nu-Matic Grinders—Air-inflated grinder.

NU-SAND—Gregg Products Co.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

NU-TEX—Atlantic Abrasive Corp.—Textile reinforced mounted points and disc wheels.

O

OK—Hammond Machinery Builders—Grinder.

OX—General Electric Co., X-Ray Dept.—X-ray apparatus.

OAKITE—Oakite Products Inc.—Detergents for cleaning aluminum coreboxes and driers, for removing sand and burrs from small iron castings and impregnating compounds from aluminum castings; rust remover.

OASIS—Ebco Mfg. Co.—Electric water coolers.

OBERLAENDER—Oberlaender Sand Co.—Core and molding sands.

OBERMAYER—S. Obermayer Co.—Flask equipment.

OCHLOCKNEE—Porter Warner Industries Inc.—Silica sands.

OGRO—Foundries Supply & Sales Co.—Bonding material for molding sands.

OHIO—Forker Corp.—Cranes.

OHIO—Ohio Blow Pipe Co.—Blower systems; dust collectors.

OHIO—Ohio Conveyor Co.—Conveyors.

OHIO—Ohio Electric Mfg. Co.—Lifting magnets.

OILDAG—Acheson Colloids Co.—Colloidal graphite in petroleum oil.

OILFREAIR—Pennsylvania Pump & Compressor Co.—Compressor.

OILFREGAS—Pennsylvania Pump & Compressor Co.—Compressor.

OILSORBERS—J. F. Pritchard & Co.—Device to remove oil and condensate from compressed air dehumidifiers.

OIL-TITE—Westinghouse Electric Corp.—Electric pushbutton switches.

OKADEE—Viloco Railway Equipment Co.—Gate valves.

OKILO—Pyro Refractories Co.—First-quality foundry fire brick.

OLD COMPANY'S LEHIGH—Lehigh Navigation Coal Co.—Anthracite coal.

OLD HICKORY STEEL-GRIP—Industrial Gloves Co.—Industrial safety apparel.

OLDS—Olds Alloys Co.—Bearing bronze.

OLDSMOLOY—Olds Alloys Co.—High-tensile bronze alloy.

OLIVE HILL—General Refractories Co.—Fireclay brick.

OLIVER—Oliver Machinery Co.—Woodworking machines and pattern shop equipment.

OLSON—Samuel Olson Mfg. Co. Inc.—Slat, belt and roller conveyors.

1-4-U—B. F. McDonald Co.—Salt tablets.

ORZAN A—Crown Zellerbach Corp.—Core binder.

OS-A-VEYOR—Simplicity Engineering Co.—Vibrating feeder.

OXALUMA—Cortland Grinding Wheel Corp.—Grinding wheels.

OXWELD—Linde Air Products Co.—Apparatus and supplies for welding, cutting, treating, and forming.

OZARK—A. P. Green Fire Brick Co.—Intermediate duty firebrick.

P

P.C.O.—General Refractories Co.—Plastic chrome ore.

P-D—Thermix Corp.—Dust collectors; stacks; fans.

P. M. 20—Perlite Mfg. Co.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

PR-40—Asbury Graphite Mills, Inc.—Carbonaceous exothermic pipe eliminator.

PX-33—Denver Fire Clay Co.—Plastic firebrick.

PAC-AIR—Ingersoll-Rand Co.—Trailer-mounted engine-driven portable air compressor.

PACIFIC—Pacific Graphite Co. Inc.—Liquid parting; core paste; sand stabilizer; facings; carbon raiser; seacoal.

PACO—North State Pyrophyllite Co.—Plastic monolithic linings.

PACO FIREBRICK—North State Pyrophyllite Co.—Furnace linings.

PAINTSTIKS—Markal Co.—Industrial paint markers in stick form.

PAKOTEMP—Pako Corp.—Automatic solution temperature control unit.

PA-LITE—Pennsylvania Perlite Corp.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

PALLETAINER—Union Steel Products Co.—Material handling, shipping, and storage containers.

PALLITE—Johns-Manville—Plates for drying operations; form driers for dielectric ovens.

PALMER-BEE—Palmer-Bee Co.—Belt idlers; pillow blocks; mold conveyors; apron feeders.

PANCAKE—Ross Operating Valve Co.—Operating valves.

PANGBORN—Pangborn Corp.—Blast cleaning and dust control equipment.

PANGBORNITE—Pangborn Corp.—Abrasive for use with Hydro-finish liquid blasting process.

PAN-L-HEAT—Jensen Specialties Inc.—Electric drying ovens.

PANORAM—American Optical Co.—Goggles.

PANTHER CREEK—American Colloid Co.—Southern bentonite.

PARACRETE—Foundry Rubber Inc.—Rubber paint for maintenance.

PARAFLO—Dravo Corp.—Warm air space heaters.

PARALINE—Allis-Chalmers Mfg. Co.—Motor bases.

PARAPLY—Foundry Rubber Inc.—Shellac replacement.

PARAPRIME—Foundry Rubber Inc.—Red lead metal primer (made with rubber).

PARASPRAY—Foundry Rubber Inc.—Core and mold surface conditioner.

PARAZERV—Foundry Rubber Inc.—Wood preservative.

PARK—Park Chemical Co.—Cut wire shot.

PARSONS—Parsons Engrg. Corp.—Blast cleaning equipment; dust collectors.

PARTEX—Delta Oil Products Co.—Nutshell parting.

PARTWELL—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Non-silica dry parting compound.

PASTEX—Peterson Core Oil & Mfg. Co.—Core paste.

PATCHTITE—Robinson Clay Products Co.—Plastic fire brick

PATTERSON-KELLEY—Patterson-Kelley Co.—Impregnators, blenders.

PAYLOADER—Frank G. Hough Co.—Tractor shovel, front-end loader.

PEARL—Springfield Facing Co.—Non-silica parting.

PEDRIFUGAL—Allis-Chalmers Mfg. Co.—Pumps.

PEERLESS—S. Obermayer Co.—Parting compound; liquid parting; core compound; core oil; mudding compound and dough roll.

PEERLESS—Peerless Electric Co.—Fans; blowers; motors.

PEERLESS—Peerless Mineral Products Inc.—Foundry sands; steel abrasives; furnace refractories; sand bonds; bentonites; refractory clays.

PEERLESS—United States Rubber Co.—Water hose.

PELRON—Pelron Corp.—Core oils.

PENCO—Pennsylvania Foundry Supply & Sand Co.—Cereal binder.

PENCOR—Geo. M. Pendergast & Co.—Fine milled molding sand.

PENN—Penn Iron Works Inc.—Dump buckets.

PENNA—Pennsylvania Foundry Supply & Sand Co.—Chaplets.

PENNINSULAR—Penninsular Grinding Wheel Co.—Vitrified and resinoid bonded snagging wheels; cone wheels; mounted points; resinoid cutoff wheels; flextype wheels.

PENNITE—Pennsylvania Foundry Supply & Sand Co.—Foundry molasses.

PENN-SAND—Pennsylvania Glass Sand Corp.—Washed and dried silica mold and core sands.

PEN-O-LED—Penola Oil Co.—Extreme pressure lubricants.

PENOLYN—Penola Oil Co.—Core oils.

PEP-UP—United States Safety Service Co.—Salt tablets.

PERALEX—PerAleX of New Jersey, Inc.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

PERFECTION—Olmsted Clay Co.—Fullers earth for testing casting cracks.

PERLITE—Texas Lightweight Products Co.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

PERM KOTE—Thiem Products Inc.—Permanent mold coating.

PERMA SHIELD—New Jersey Matchplate Co.—Treated die casting dies.

PERMABRASIVE—Hickman, Williams & Co., National Metal Abrasive Co.—Malleable shot and grit.

PERMAFIL—General Electric Co., Chemical Dept.—Casting sealant.

PERMI-BOND—Delta Oil Products Co.—Seacoal replacement.

PERMOLDKOAT—Delta Oil Products Co.—Coating for permanent molds.

PER-MOL-SPRAY—Frederic B. Stevens Inc.—Permanent mold coating.

PERRY—Pickands, Mather & Co.—Foundry coke.

PETERSON—Peterson Welding Laboratories—Table top grinder for flat surface grinding.

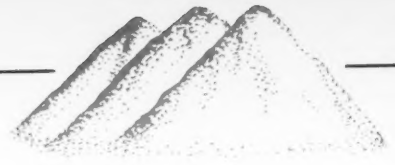
PHILADELPHIA—Philadelphia Coke Co.—Foundry coke.

PHIL-BOX—Phillips Mine & Mill Supply Co.—Material handling box with collapsible sides.

PHIL-DUMPS—Phillips Mine & Mill Supply Co.—Dumping hopper.

PHILGAS—Phillips Petroleum Co.—Butane; propane; butane-propane mixtures.

TRADE NAMES



PHILO—Ohio Ferro-Alloys Corp.—Ferroalloys.

PHIL-STAX—Phillips Mine & Mill Supply Co.—Material handling boxes designed for stacking.

PHOSTUBE—All-State Welding Alloys Co.—Phosphor-copper rod.

PHOTOTROLLERS — Westinghouse Electric Corp.—Electronic control.

PICKER—Picker X-Ray Corp.—X-ray equipment.

PILGRIM—Springfield Facing Co.—Binder and core paste.

PIN-LOCK—Leschen Wire Rope Div.—Wire rope sling thimbles.

PIONEER—Republic Steel Corp.—Pig iron.

PIRAMID—Tamms Industries Inc.—Skimmers for brass and bronze.

PLAIN TABLE—American Wheelabrator & Equipment Corp.—Airless abrasive blast cleaning machines.

PLASKON—Barrett Division—Core and shell mold resin binders; molding compounds for plastic driers.

PLASTIC INSULATION—Mexico Refractories Co.—Insulating cement.

PLASTIC IRON—Pennsylvania Foundry Supply & Sand Co.—Iron cement.

PLASTIC QUIK-PAK—A. P. Green Fire Brick Co.—High-duty plastic firebrick.

PLASTILOCK—B. F. Goodrich Rubber Mfg. Co.—Adhesives.

PLASTIPLATE—Plastic Corp. of Chicago—Pattern plastic.

PLASTI-PLATE—Atlas Plastic & Aluminum Pressure Plate Co.—Matchplate.

PLASTISAND — Acme Resin Corp. — Resin-coated sand.

PLASTOLITE — American Optical Co. — All-plastic lenses.

PLUM—M. A. Bell Co.—Graphite-base core wash.

PLUNGER-SLICK—G. W. Smith & Sons—Lubricant for moving parts of permanent molds or die casting machines.

PNEOLATOR—Mine Safety Appliances Co.—Automatic artificial respiration device.

PNEUBIN—Gerotor May Corp.—Pulsating bin panels for aiding flow of bulk materials.

PNEU-LIFT—Lehigh Foundries Inc.—Air hoist.

PNEUMAFEED—Schramm Inc.—Self-propelled wagon drill.

PNEUMAPOWER — Schramm Inc. — Self-contained engine-driven compressors.

PNEUMATRACTOR—Schramm Inc.—Self-propelled tractor compressors.

POP-OFF—Hines Flask Co.—Removable aluminum foundry flask.

PORITE — Porcelain Products Inc. — Ceramic strainer cores.

PORLOX—Prenco Products Inc.—Impregnant for porous castings.

PORO-CARBON—R. P. Adams Co.—Liquid filter.

PORO-SCREEN—R. P. Adams Co.—Liquid filter.

PORO-STONE—R. P. Adams Co.—Liquid filter.

POROSWAY—A. P. deSanno & Son Inc.—Grinding wheels.

POROX—Patterson Foundry & Machine Co.—White porcelain grinding balls; acid-proof linings.

PORT COLBOURNE—Hickman, Williams & Co.—High-purity pig iron for production of nodular iron castings.

PORTA—A. B. Farquhar Co.—Conveyors.

PORTAGE — Industrial Silica Corp. — Washed and dried silica core and mold sands; silica blasting sands; annealing-packing sand and gravel; silica for refractories.

PORTAGE — Manley Sand Co. — Dried and screened silica sand.

PORTER CABLE—Porter Cable Machine Co.—Portable electric saws, sanders, routers.

PORTO-MULLER—National Engineering Co.—Portable sand muller.

PORTOVENT—Flexaust Co.—Flexible hose for portable blowers.

PORT-ZITE—Wehenn Abrasive Co.—Ganister.

POUR RITE — Whiting Corp. — Ladle gear bracket.

POWELL—Powell Pressed Steel Co.—Pallets, skids and boxes.

POWER FLOW—De Bothezat Fans Div.—Axial flow roof vent.

POWER HELPER — Metzgar Co. — Horizontal and elevating, portable and stationary belt conveyors; live roller conveyors.

POWERLINE—Chelsea Fan & Blower Co.—Industrial fans.

POWERPACK—Addison Semmes Corp.—Corrugated fibreboard expendable pallet.

POWRWORKER—Clark Equipment Co.—Powered hand truck.

PRECIPITRON—Sturtevant Div.—Electrostatic air cleaners.

PREMIX—Maxon Premix Burner Co.—Industrial gas burners.

PREPARATOR—Beardsley & Piper Division—Sand conditioning unit.

PRESCALLOY—Pressed Steel Co.—Annealing boxes and covers; radiant combustion tubes; pyrometer tubes.

PRESS-TENDER—E. W. Buschman Co.—Portable belt conveyor.

PRESSURE PROOF—Angell Nail & Chaplet Co.—Chaplets.

PRESSWELD—Service Caster & Truck Co.—Casters.

PREST-O-LITE — Linde Air Products Co. — Acetylene gas and air-acetylene apparatus.

PREST-O-WELD—Linde Air Products Co.—Welding and cutting apparatus.

PRIME-MOVER — Prime Mover Co. — Power wheelbarrow.

PRINTWEIGH — Toledo Scale Co. — Weight printing scales.

PRODAG—Acheson Colloids Co.—Semi-colloidal graphite in water.

PROPELLAIR—Robbins & Myers Inc.—Industrial ventilating fans.

PROTECT-A-MAG—Beardsley & Piper Division—Magnetic separator.

PROTECTOCOTE — American Optical Co. — Aprons and protective clothing.

PROTECTOMOTOR — Dollinger Corp. — Industrial filters.

PROTEXABOX—Martin Engineering Co.—Rubber-tipped corebox pins.

PROTO PLOW—Factory Specialty Co.—Automatic plow for sand distributing belt conveyors.

PULLEYFLEX — C. R. Daniels Inc.—Folded construction belting.

PULLINSERT—Martin Engineering Co.—Corebox blow buttons.

PULMOSAN—Dockson Corp.—Respirators.

PURAIR—W. W. Sly Mfg. Co.—Sandblaster's helmet.

PURITE—Mathieson Chemical Co.—Fused soda ash.

PUROX—Linde Air Products Co.—Welding and cutting apparatus.

PYOD—Foxboro Co.—Iron-constantan thermocouples.

PYRO — Pyrometer Instrument Co. — Optical, surface and contact, immersion, indicating and radiation pyrometers.

PYRO STEEL—Pyro Refractories Co.—Heavy-duty fire brick.

PYRODISC—Lindberg Engineering Co.—Portable laboratory hot plate.

PYROFLEX—C. R. Daniels Inc.—Hot materials conveyor belting.

PYROKOAT—Delta Oil Products Co.—Wash.

PYROSEAL—Hill & Griffiths Co.—Silica core and mold wash.

PYROSEAL—National Gypsum Co.—Exothermic riser.

PYROSEAL DAUB—Hill & Griffiths Co.—White core-mudding and sealing compound.

Q

Q-ROK—Pennsylvania Glass Sand Corp. — Crushed quartzite abrasive for sand blasting.

QUEEN BEE—Richmond Glove Corp.—Work gloves.

QUICK-AS-WINK—C. B. Hunt & Son Inc.—Air and hydraulic control valves.

QUICKLAG — Westinghouse Electric Corp. — Electric circuit breakers.

QUIET-TYPE—Cleveland Vibrator Co.—Air cushioned type of air-powered vibrators.

QUIK-DRY—Frederic B. Stevens Inc.—Ignitable solvent carrier for core and mold coatings.

QUIK-SET — Delta Oil Products Co. — Core paste.

QUIK-LIFT—Coffing Hoist Co.—Electric hoists, coil chain.

R

R & J—R & J Foundry—Aluminum bottom boards and core plates.

R & M—Robbins & Myers Inc.—Hoist, cranes, winches, electric motors.

RACO—Reid-Avery Co.—Welding electrodes.

RACOLLOY—Reid-Avery Co.—Welding electrodes.

RADIAC—A. P. DeSanno & Son Inc.—Grinding wheels and abrasive cut-off machines.

RADIAGRAPH—Air Reduction Sales Co.—Gas cutting machine.

RADIAL BLAST — Dreisbach Engineering Corp.—Pan type, enclosed blast wheel.

RADIANT—Tennessee Products & Chemical Corp.—Foundry coke.

RADIATOR—Dayton Oil Co.—Core oils.

RADI-HEAT — Burdett Mfg. Co. — Industrial combustion equipment.

RADIOCLARITE—Pittsburgh Metals Purifying Co.—Brass flux for open-flame furnace melting.

RAIL MASTER—American Monorail Co.—Heavy duty monorail equipment.

RAINBOW—United States Rubber Co.—Water hose.

RAINBOW—Whitehead Bros. Co.—Core compound.

RAJON—M.F.I. Inc.—Railroad car unloader.

RAMPAK—Kirk White Chemical Co.—Impregnant for sealing porous castings.

RAMTITE—Ramtite Co.—Plastic refractories.

RAMTITE GUNMIX—Ramtite Co.—Heat setting gunning refractory.

RANGER—General Refractories Co.—Fireclay brick.

RANSBURG—Ransburg Electro-Coating Corp.—Electrostatic painting equipment.

RANSOHOFF—N. Ransohoff Inc.—Wet star return cleaning mill.

RAPID—Pioneer Mfg. Co.—Molding machines.

RAPID—Wadsworth Equipment Co.—Core extruding machines; twisted steel gaggers; steel core plates; core trays; core cut-off and coning machines.

RARE MET—Molybdenum Corp. of America—Rare earth.

RATIOTROL—North American Mfg. Co.—Air-oil ratio regulator for burners.

RAVENITE—Ironton Fire Brick Co.—Black plastic monolithic refractory.

RAY-MAN F—Manhattan Rubber Mfg. Division.—Conveyor belts.

RAYOTUBE—Leeds & Northrup Co.—Radiation-type temperature detectors.

RBON—Pennsylvania Foundry Supply & Sand Co.—Resin binder.

REACTROL—General Electric Co., Schenectady—Regulator and control for heat control.

READING—Reading Crane & Hoist Corp.—Overhead traveling cranes; electric hoists; chain hoists.

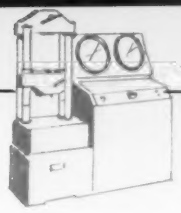
RECARB-X—U. S. Graphite Co.—Metallurgical graphite for carbon raising in the ladle.

RECTOX—Westinghouse Electric Corp. — AC to DC power rectifiers.

RED ARROW—Lift Trucks Inc.—Single stroke lift trucks.

RED ARROW—W. O. Barnes Co. Inc.—Hand and power hack saw blades.

RED BAND—Maxon Premix Burner Co.—Burner safety valves.



RED CHIEF—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Core paste.

RED COAT—Michigan Abrasive Co.—Coated abrasives; abrasive belts; rolls; discs and sheets.

RED DEVIL—Foundry Supplies Mfg. Co.—Electric vibrator.

RED FLINT—Carpenter Brothers Inc.—Eau Claire packing sand.

RED SEAL—Jervis B. Webb Co.—Conveyor trolleys.

RED STREAK—Simonds Abrasive Co.—Grinding wheel steel flanges.

RED STREAK—National Super Service Co.—Continuous duty industrial cleaner.

RED VELVET—Thiem Products Inc.—Mudding compounds.

RED X8—Apex Smelting Co.—Cylinder block casting alloy ingot.

RED X10 AND RED X11—Apex Smelting Co.—Aluminum piston alloy ingot.

REDA—Reda Pump Co.—Reverberatory type melting furnaces.

REDDY SANDY—Newaygo Engineering Co.—Individual floor portable shakeout and conditioner.

REDFORD—Redford Iron & Equipment Co.—Core blowers.

REDGRIP—Pennsylvania Foundry Supply & Sand Co.—Core paste.

REDLER—Stephens-Adamson Mfg. Co.—Enclosed conveyor elevators.

REDMONT — Edmont Mfg. Co. — Neoprene-coated glove.

RED-STRAND—Leschen Wire Rope Div.—Wire rope.

REDWOOD—Manley Sand Co.—Dried and screened naturally bonded molding sand.

REECEMELT — Herbert A. Reece — Foundry operation and control service.

REFAX—American Car & Foundry Co.—Melting and heat treating pots; die casting goosenecks.

REFLECTOGAGE — Sperry Products, Inc. — Ultrasonic flaw detector.

REFLECTOSCOPE — Sperry Products, Inc.—Ultrathickness measurement.

REFRACT-ALL—Refract-All Co.—Refractory gun applicator.

REFRACTO—National Stone Co.—Monolithic refractory lining.

REFRACTO—Hardy Sand Co.—Mold spray.

RELEASE AGENT G—M. A. Bell Co.—Sand addition.

RELIANCE—Jeffrey Mfg. Co.—Belt idler.

REMMEY—Richard C. Remmey & Son Co.—Refractory shapes, cements.

REPUBLIC—Republic Steel Corp.—Pig iron; foundry flasks; foundry wire.

REPUBLIC—Lee Rubber & Tire Corp.—Steam hose.

RESERVE—Reserve Machine & Tool Co.—Permanent molds.

RESIMENE—Monsanto Chemical Co. — Urea core binder; melamine laminating resin.

RESINOX—Monsanto Chemical Co. — Shell molding resin; phenolic core binder.

RESIPLAST—Plastic Corp. of Chicago—Pattern plastic.

RESISTORIP—New York Belting & Packing Co.—Shake-out belting.

RESOTRON—General Electric Co.—X-ray apparatus.

REVIVO BOND—Eastern Clay Products Dept.—Bonding clay.

REX—Chain Belt Co.—Chains; conveyors; foundry systems.

REXALL—Imperial Belting Co.—Belting.

REXALLOY—Crucible Steel Co. of America—Cobalt-base alloys for cutting tools and wear-resistant applications.

REXARC — Sight-Feed Generator Co.—Hard facing and manganese electrodes; automatic welders; positioners.

REXWELD—Crucible Steel Co. of America—Hard facing welding materials.

REYNOLDS—Reynolds Metal Co.—Aluminum pig and ingot.

REZ-GLU—Hill & Griffiths Co.—Core paste.

RICE—Rice Pump & Machine Co.—Centrifugal pumps.

RIENACKER — Landis Mfg. Co. — Corebox vents.

RIETZ—Rietz Lumber Co.—Flask and pattern lumber.

RILLTON—S. Obermayer Co. —Seacoal; brass cleaner.

RING TRUE—Bohn Aluminum & Brass Co.—Babbitt.

RINGLIFT—States Engineering Corp.—Self-propelled, self-loading foundry sand conditioner.

RIPL-FLO—Allis-Chalmers Mfg. Co.—Vibrating screen.

RISER-X—Exothermic Alloys & Sales Service—Exothermic riser compound.

RISOTHERM—Exomet Inc.—Exothermic material.

RITE TO WEAR—Wash-Rite Co. Inc.—Industrial work gloves and protective clothing.

RITE-SPEED—Simonds, Worden, White Co.—Floor stand grinder.

RITEX—General Refractories Co.—Basic brick.

ROBINSON — Robinson Clay Products Co.—Cupola block; fire brick.

ROCK RIVER—Safety Tread Pattern Lumber Division.—Diamond-faced pattern boards for casting safety tread.

ROCKET—W. O. Barnes Co. Inc.—Hack saw blades, hand and power.

ROCKWOOD—Tennessee Products & Chemical Corp.—Malleable and foundry pig iron.

RO-FLO—Allis-Chalmers Mfg. Co.—Air compressor.

ROKYT—Magee Brothers—Liquid core binder.

ROL-A-COR—Beardsley & Piper Division—Corebox rollover and drawing device.

ROL-A-DRAW—Beardsley & Piper Division—Rollover draw molding machines.

ROLLER RIDDLE—Beardsley & Piper Division—Small slide-mounted sand riddle.

ROLLEX—C. R. Daniels Inc.—Live roller conveyor belting.

ROLL-OR-WHEEL — E. W. Buschman Co.—Rollover and wheel type conveyors.

ROL-O-CAST—Herman Pneumatic Machine Co.—Horizontal centrifugal casting machine for soil pipe, etc.

ROLOTAC—Elwell Parker Electric Co.—Controller.

ROOTS — Roots-Connersville Blower Corp. — Centrifugal blowers.

ROSINAL—Cities Service Oil Co.—Rosin in solution.

ROSOTRON—General Electric Co., X-Ray Dept.—X-ray apparatus.

ROSS—Clark Equipment Co.—Fork lift truck and straddle carrier.

ROSS—Ross Operating Valve Co.—Operating valves.

ROSS—J. O. Ross Engineering Corp.—Cupola hot blast system.

ROSSBOROUGH—Rossborough Supply Co.—Copper oxide; fluxes.

ROTAIR—Eclipse Fuel & Engineering Co.—Air draw furnaces.

ROTA-LIFT—Osborn Mfg. Co.—Jolt squeezer for matchplate work.

ROTARY COOLING HOOD—National Engineering Co.—Sand cooler.

ROTAX—Foxboro Co.—Electrical control system.

ROTO—Foundry Supplies Mfg. Co.—Adjustable electric vibrator.

ROTOBLAST—Pangborn Corp.—Airless, centrifugal blast cleaning equipment.

ROTO-CLONE—American Air Filter Co.—Dust collector.

ROTO-CORE — Osborn Mfg. Co. — Automatic five-station core blower.

ROTO-FEED—Beardsley & Piper Division — Sand delivery device.

ROTO-FINISH—Roto-Finish Co. — Tumbling barrels.

ROTO-MOLD—Beardsley & Piper Division — Turntable for use in multiple station molding installations.

ROTOPLANE—Foundry Supplies Mfg. Co.—Sifter.

ROTOR—Rotor Tool Co. — Pneumatic and electric portable tools.

ROTO-WASH — Newcomb-Detroit Co. Inc. — Spray booths.

RO-TWIN—Allis-Chalmers Mfg. Co.—Air compressor.

ROURA HOPPER—Roura Iron Works—Self-dumping hopper.

ROYAL—Springfield Facing Co.—Dry sand and core blacking.

ROYAL—United States Rubber Co.—Air hose; v-belts.

ROYAL PARACOAT—Foundry Rubber Inc.—Pattern finish and mold impregnator.

ROYER—Royer Foundry & Machine Co.—Sand aerator, cleaner and mixer; shakeout for light castings.

ROYER SCRAP REMOVER—Royer Foundry & Machine Co.—Combination shakeout, sand separator and blender designed for clamshell bucket feeding.

ROYERSFORD—Royersford Foundry & Machine Co.—Tumbling barrels.

RUBBER GLASS—Lee Rubber & Tire Corp.—Hot-material conveyor belt.

RUD-O-MATIC — McCaffey-Ruddock Tagline Corp.—Taglines for clamshell buckets; magnet reels.

RUGER—Ruger Equipment Inc.—Cranes.

RUPTAIR—Allis-Chalmers Mfg. Co.—Magnetic air circuit breakers.

RUSS—Russ-Electric Furnace Co.—Electric furnaces.

RUST-BAN—Penola Oil Co.—Protective coatings.

RUSTREM—Speco Inc.—Anti-rust paint.

RYOLEX—Ryolex Corp. of Illinois—Mineral perlite for use as sand addition, riser insulation and ladle cover.

S

S & B SANDCUTTER—Sather Mfg. Co.—Motor-driven machine for cutting sand in windrows.

S. F. E.—Standard Fuel Engrg. Co.—Annealing and melting furnaces.

S-G—Sonken-Galamba Corp.—Aluminum ingot.

SM—Electro Metallurgical Co.—Ferrochrome for ladle additions to steel or iron.

SM-55—General Electric Co., Chemical Division—Silicone release agent.

SMZ—Electro Metallurgical Co.—Silicon-manganese-zirconium alloy for ladle addition to iron.

SS UNIT—Allis-Chalmers Mfg. Co.—Pumping unit.

SSC UNIT—Hewitt-Robins Inc.—Shakeout, screeing, lump breaker conveyor unit equipped with magnetic separator.

SAFCO—Swan-Finch Oil Corp.—Core oils.

SAF-CO-METER—United States Safety Service Co.—Carbon monoxide indicator.

SAFE-LOCK—Macwhyte Co.—Cable assemblies.

SAFE-T-CHEK — Modern Engineering Co.—Regulators.

SAFETICOTE—American Optical Co. — Protective and cleaning skin cream.

SAFETY BEE—Richmond Glove Corp.—Work gloves.

SAFETY-CIRCLE—Allis-Chalmers Mfg. Co.—Electric motors.

SAFETY PULL—Coffing Hoist Co.—Ratchet lever hoists.

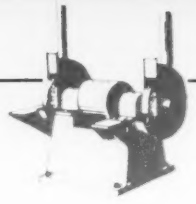
SAFETY SHEL-KAST—Safety Vulcanizer Co.—Shell molding machine.

SAF-HED-HAT—United States Safety Service Co.—Safety hard hat.

SAF-I-CHEM—United States Safety Service Co.—All-plastic acid and chemical goggle.

—For addresses of companies mentioned above, see list starting on page 184—

TRADE NAMES



SAF-I-CUP—United States Safety Service Co. —Welders' and chippers' goggles.

SAF-I-FLEX—United States Safety Service Co. —All-purpose plastic cover goggle.

SAF-I-SHIELD—United States Safety Service Co.—One-piece plastic goggle.

SAF-I-SPEC—United States Safety Service Co. —All-plastic safety spectacle.

SAF-I-SPECTACLE — United States Safety Servce Co.—Acetate and metal frame safety spectacle.

SAF-I-WELD—United States Safety Service Co.—Welders' helmet.

SAF-T-CUT—Bay State Abrasive Products Co. —Disc-wheels and cut-off wheels.

SAGINAW—Saginaw Products Co. — Gravity conveyor rollers; transfer tables; casters; chain hoist trolleys; conveyor parts.

SAHARA—Imperial Belting Co.—Belting.

SAIRSET—A. P. Green Fire Brick Co.—Air-setting refractory mortar.

SAJCO—Hickman, Williams & Co.—Jackets.

SALLOY—Geo. Sall Metals Co.—Matchplate alloy.

SAMSON—Globe Steel Abrasive Co., Pittsburgh Crusned Steel Co.—Abrasive shot.

SAN-BLO—Federal Foundry Supply Co.—Core and mold blowers.

SAND ARRESTER TUBE—Martin Engineering Co.—Stem holding blow tubes.

SAND HOG—Royer Foundry & Machine Co.—Mobile sand conditioning unit.

SAND MEX—U. S. Graphite Co.—Sand additive for increased flowability.

SAND SEAL—M. A. Bell Co.—Silica-base core and mold wash.

SANDALLOT — Factory Specialty Co.—Sand metering device to molding machines.

SANDCUTTER — American Wheelabrator & Equipment Corp.—Mobile molding sand conditioner.

SANDITIONER—Jeffrey Mfg. Co.—Sand conditioner.

SANDMASTER—American Wheelabrator & Equipment Corp. — Foundry sand conditioners.

SAND-O-FLEX—Wyzenbeek & Staff Inc.—Contour sander.

SANDSLINGER—Beardsley & Piper Division—Mechanical device (stationary or movable) for throwing sand into a mold or corebox.

SANDUSKY—Delhi Foundry Sand Co.—Sand.

SANIGLAS—American Optical Co.—Goggles.

SANKEY—Ellwood Safety Appliance Co.—Foot, toe, shin protective equipment.

SANMIZER—Hydro-Blast Corp. — Wet sand reclamation equipment for waste foundry sand.

SANS-SLIP—Simonds Abrasive Co.—Anti-slip floor abrasive.

SANTROL—Thiem Products Inc.—Sand conditioning agent.

SAPPHIRITE — Diamonite Division — Blast nozzles; electrical insulator guides and supports for induction heating and welding; tumbling mill grinding rods.

SATANITE — A. P. Green Fire Brick Co.—High-alumina mortar and ladle wash.

SAVAGE—Robinson Clay Products Co.—Fire brick.

SAVAGE-1—Oak Hill Fire Brick Co.—Cupola blocks.

SCHNECTADY—Schenectady Resins Division. —Shell mold resins; coated sand resins; silicone release agents, and powdered shell adhesives.

SCHNEIBLE TYPE SW—Claude B. Schneible Co.—Cupola fly ash collector.

SCHRADER—A. Schrader's Son—Blow guns; quick connecting couplers; hose fittings; pneumatic hose; hose ferrules; hose reels.

SCHUNDLER—F. E. Schundler & Co. Inc.—Zirconium sand and flour.

SCOTCH BRAND—Hill & Griffiths Co. — Liquid parting; core sand conditioner.

SCRAP CONTROL—Royer Foundry & Machine Co.—Stationary sand conditioning unit.

SCREEN-ALL — Lippmann Engineering Works —Vibrating screens.

SCREENARATOR—Beardsley & Piper Division.—Portable vibratory screening device.

SCROLL-AIRE—Newcomb-Detroit Co. Inc.—Core ovens.

SEABOARD—Debevoise-Anderson Co. Inc.—By-product foundry coke.

SEAL-CLAD — Allis-Chalmers Mfg. Co. — Electric motors.

SEAL-COTE — Frederic B. Stevens Inc. — Graphite-base core wash.

SEALMASTER—Stephens-Adamson Mfg. Co.—Industrial ball bearing units.

SEAL-TYPE—Shanafelt Mfg. Co.—Chaplets.

SEICO—Special Engineering Instrument Co., div. of Grindle Corp.—Instrument design and development.

SELECTOMATIC — Louden Machinery Co.—Automatic monorail despatch systems.

SELECTRO — Productive Equipment Co.—Vibrating screens.

SELECTROL — Exact Weight Scale Co. — Electronic checkweighers.

SELF-CLEANING—Pangborn Corp.—Dust collector incorporating continuous cleaning of cloth screens.

SENECA—Seneca Wire & Mfg. Co.—Annealed foundry wire.

SENSITORQUE—Bellows Co.—Torque sensitive drill press feed.

SENSITROL—North American Mfg. Co.—V-port manual oil valve.

SENTRY—B. F. Goodrich Rubber Mfg. Co.—Fire hose.

SENTRY—General Shoe Corp.—Safety shoes.

SEQUOIA — Manley Sand Co.—Dried and screened naturally bonded molding sand.

SERVCOTE—Cities Service Oil Co.—Core wash.

SERVICE — W. O. Barnes Co. Inc.—Molybdenum power hack saw blade.

SERVICE BLACKING—Frederic B. Stevens Inc.—Core and mold coating.

SERV-RITE—Claud S. Gordon Co.—Thermocouples, accessories and pots.

700 ALLOY—Apex Smelting Co.—Aluminum bearing alloy.

SEWANEE—Porter Warner Industries Inc.—Silica sands.

SHADOGRAPH — Exact Weight Scale Co.—Over-and-under weight scales.

SHAFER—Chain Belt Co.—Bearings.

SHALCO — Shalco Engineering Corp.—Shell molding machines.

SHALLWAY—Manufacturing & Mine Supply Co.—Dry blenders; foundry engineering.

SHAMVA—Mullite Refractories Co.—Electric furnace refractories.

SHARON—Ohio Fire Brick Co.—Silica brick and shapes.

SHAW-BOX—Manning, Maxwell & Moore Inc. —Cranes.

SHEL-KAST — Safety Vulcanizer Co.—Shell molding machine.

SHELLBLOWMATIC—Beardsley & Piper Division—Shell mold blowing machines.

SHELL BONDER—Shell Process Inc.— Fixture for sealing shell mold joints.

SHELLFORMATIC—Beardsley & Piper Division—Shell molding machines.

SHELLMOLD—Shellmold & Machine Co.—Shell molding machines.

SHELL-MOLDING PENN-SAND — Pennsylvania Glass Sand Corp.—Shell molding sand.

SHELL-O-MATIC — Shell-O-Matic Corp.—Automatic shell molding machine.

SHEPARD NILES — Shepard Niles Crane & Hoist Corp.—Cranes, hoists and cupola chargers.

SHOTPRUF — Pangborn Corp.—Protective aprons and hoods used in airblast process.

SHOVELOADER—Baker-Lull Corp.—Bulk material front end loader.

SHURBAKE—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Core compound and core oil extender.

SIGHT FEED—Sight-Feed Generator Co.—Acetylene generators and compressing plants.

SIGNAL—B. F. Goodrich Rubber Mfg. Co.—Fire hose.

SILCO—Carpenter Brothers Inc. — Wisconsin molding sand.

SILENT HOIST—Silent Hoist & Crane Co.—Car movers; capstans; winches.

SILENTVANE — Sturtevant Div.—Ventilating and exhaust fans.

SIL-GAN—Eugene W. Smith—Refractory mixture for gun placement in cupolas, ladles and furnaces; quartzite refractory for hand patching of furnaces and ladles.

SILICRETE—Industrial Silica Corp.—Quartz aggregate for industrial floors.

SIL-O-CEL—Johns-Manville — Insulating firebrick made from diatomaceous silica.

SILTUBE — All-State Welding Alloys Co.—Silver brazing wire.

SILVENTVANE—Westinghouse Electric Corp. —Centrifugal fans and blowers.

SILVER LINE—Thor Power Tool Co.—Portable electric tools.

SILVER PHOSTUBE—All-State Welding Alloys Co.—Phosphor-copper silver rod.

SILVER SLICK—U. S. Graphite Co.—Flake graphite compound for coating green sand molds.

SIMANAL—Ohio Ferro-Alloys Corp.—Silicon-manganese-aluminum ferroalloy.

SIMPLEX—Electro Metallurgical Co.—Low-carbon ferrochrome.

SIMPLISYN — Pennsylvania Foundry Supply & Sand Co.—Facing; binder.

SIMPSON MIX-MULLERS—National Engineering Co.—Foundry sand mixers.

SINKRITE—Lava Crucible Co. of Pittsburgh —Hot top compound.

SIPI—SiPi Metals Co. — Brass and bronze ingot.

SIROCCO—American Blower Corp.—Dust collectors.

SIX THREE EIGHT—Pacific Graphite Co. Inc.—Mold and core wash.

SK-7—A. P. Green Fire Brick Co.—Insulating castable.

SKID-DUMPS—Phillips Mine & Mill Supply Co.—Skid with dumping hopper.

SKIL—Skil Corp.—Portable tools.

SKILKAST — Badger Perlite Products Co., Great Lakes Carbon Corp. Perlite Div., Precast Slab & Tile Co., Inc.—Mineral perlite for use as sand addition, riser insulation and ladle cover.

SKIPTOOTH—W. O. Barnes Co. Inc.—Band saw blades.

SKIPTROL — Beardsley & Piper Division—Automatic timing control for loading sand into skip hoist bucket.

SKULLGARDS—Mine Safety Appliance Co.— —Hats for head protection.

SKY-BLAST—Robins & Meyers Inc.—Power roof ventilators.

SLAGGER—American Conveyor Co.—Quench tank and bucket elevator for slag disposal.

SLAGTITE — Laclede-Christy Co.—Monolithic ladle linings for pouring iron and steel; brick mortar and coating.

SLICK-SEAL—Frederic B. Stevens Inc.—Core joint mudding compound.

SLIKTITE—Delta Oil Products Co.—Mudding and patching compound.

SLINGERSLICK — Buckeye Products Co. — Liquid parting.

SLIP-NOT—Milwaukee Leather Belting Co.— Leather belting.

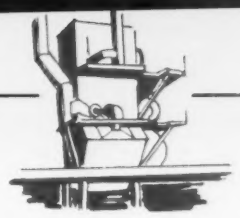
SLOSS—U. S. Pipe & Foundry Co.—Pig iron; foundry coke; cold-dip asphalt paint

SLY—W. W. Sly Mfg. Co.—Blast Cleaning equipment; dust filters; industrial ovens

SMILLIE—C. M. Smillie & Co.—Corebox vents; inserting drill; vent cleaner.

SMITH & RICHARDSON—Smith & Richardson Mfg. Co.—Hinge tubes, chaplets and foundry specialties.

—For addresses of companies mentioned above, see list starting on page 184—



SMOOTH-KAST—Geo. M. Pendergast & Co.—Fine dried silica sands.

SMOOTH-ON—Smooth-On Mfg. Co.—Metallic cements.

SNAP-TITE HI-FLOW — Snap-Tite Inc.—Hose and pipe couplings.

SNO-WHITE—Frederic B. Stevens Inc.—Shake-bag nonsilica parting.

SODA BRIQUETTES — Columbia Southern Chemical Corp.—Desulphurizer.

SOFFELITE—Pittsburgh Metals Purifying Co.—Aluminum flux.

SOFFEL'S—Pittsburgh Metals Purifying Co.—Fluxes for metals and alloys; coatings for permanent molds, dies and iron pots.

SOLO H—American Metallurgical Products Co.—Degasser and metal flux.

SOLVAY — Solvay Process Division.—Dense soda ash.

SONIZON—Magnaflux Corp.—Ultrasonic thickness measure.

SORBO-MAT—Sorbo-Mat Process Engineers—Specification processed cast iron.

SPECIAL TENACITY—Hill & Griffiths Co.—Core paste.

SPECIAL UNBREAKABLE — W. O. Barnes Co. Inc.—Hand hack saw blades.

SPEC-LAB—National Spectographic Laboratories—Package spectographic laboratory.

SPEC-POWER—National Spectographic Laboratories—Spectographic excitation unit.

SPEC-READER—National Spectographic Laboratories. — Comparator-microphotometer for quantitative analysis.

SPEED TRUCK—Kalamazoo Mfg. Co.—Flat material handling truck.

SPEED-BARROW—American Conveyor Co.—Three-wheel material handling cart.

SPEED-DRAW—Beardsley & Piper Division.—Pin-Lift machine.

SPEEDEE — Adrian Production Tool Co. — Rotary files and burrs.

SPEEDRI—Frederic B. Stevens Inc.—Torch drying solvent carrier for core and mold coatings.

SPEEDMULLOR—Beardsley & Piper Division.—Batch type sand preparation unit.

SPEEDOMAX—Leeds & Northrup Co.— Electronic recorder and controllers.

SPEEDSLINGER—Beardsley & Piper Division.—Heavy-duty sandslinger. Operator rides on ramming head.

SPEEDWAY—Wright Hoist Division—Electric hoists.

SPEEDWEIGH—Toledo Scale Co.—Over-under weight checking scales.

SPEEDY — Alpha-Lux Co. — Sand moisture tester.

SPENCER—Spencer Turbine Co.—Turbo compressors for cupola blowesrs; industrial vacuum cleaners.

SPONGE-AIRE — Goggle Parts Co. Inc.—Sweatbands.

SPOT-AIR—Ingersoll-Rand Co.—Radial type gasoline engine powered air compressor.

SPOTCHECK — Magnaflux Corp.—Dye penetrant inspection.

SPRAY MIX—Mexico Refractories Co.—Refractory coating.

SPREADLOCK—Fremont flask Co.—Foundry flasks.

SPRING BEARING—West Bend Mfg. Co.—Hand floor trucks.

SPRINGFIELD—Springfield Facing Co.—Core paste; Ceylon plumbago; blacking.

SQUARE HEAD — Wellman Products—Brass and steel patternmaker's dowels.

STABILFLO — Foxboro Co.—Pneumatic control valves.

STABILITE—Delta Oil Products Co.—Wash.

STABILITE—Hill & Griffiths Co.—Carbonized cellulose for steel foundries.

STABILOG—Foxboro Co.—Pneumatic industrial control system.

STACKPOLE—Stackpole Carbon Co.—Carbon and graphite rods and plates.

STA-KLEEN — Allis-Chalmers Mfg. Co. — Vibrating screen for fine materials.

STANDARD—Standard Pattern Works—Core grinder.

STANDARD — Harbison-Walker Refractories Co.—Plastic fire brick.

STANDARD—General Refractories Co.—Silica brick.

STANDARD—Standard Conveyor Co.—Gravity roller and belt conveyors.

STANDARD—Standard Mfg. Co.—Industrial warehouse trailers; shop trucks; casters.

STANHO—Standard Horse Nail Corp.—Taper, straight and cotter pins; machine and woodruff keys.

STANZOIL—Pioneer Rubber Co.—Industrial gloves.

STAR—Harbison-Walker Refractories Co.—Silica brick.

STAR—Star Porcelain Co. — Strainer cores; casting rods and tubes.

STAR—Asbury Graphite Mills Inc.—Coke-base core and mold wash.

STAR—M. A. Bell Co.—Zircon flour base facing.

STAR—Pacific Graphite Co. Inc.—Core paste.

STARRBIDE—American Refractories & Crucible Corp.—Crucibles; slaghole blocks.

STARRLUM—American Refractories & Crucible Corp.—Refractories; aluminum oxide.

STARRMAC—American Refractories & Crucible Corp. — Refractories, MgO.

STARRSIL—American Refractories & Crucible Corp.—Refractories, silicon carbide.

STA-SET — American Optical Co.—Finger guards.

STATE — Freeman Supply Co. — Disc and spindles sanders.

STA-WARM—Sta-Warm Electric Co.—Electric glue pots.

STAYNEW — Dollinger Corp.—Industrial and ventilation filters.

STEARNS—Stearns Magnetic Inc.—Lifting magnets; magnetic pulleys; grinding holding magnets; suspended separation magnets.

STEELBLAST — Steelblast Abrasives Co.—Chilled iron shot and grit.

STEEL CARVE—Jeffrey Mfg. Co.—Sprocket.

STEEL-GRIP—Industrial Gloves Co.—Industrial safety apparel.

STEELKLAD—General Refractories Co.—Basic brick.

STEELKOAT—Delta Oil Products Co.—Wash.

STEEL-VANEER—Keystone Refractories Co.—Refractory sand.

STEINER-IVES—Steiner-Ives Co.—Core ovens.

STERBON — Sterling Abrasives Division.—Grinding wheels.

STERLING — Sterling Wheelbarrow Co.—Flasks; flask pins and bushings; bottom boards and core plates; core trucks; wheelbarrows.

STERLING NO. 2—Sterling Abrasives Division.—Abrasive chuck and segments.

STERLING P M—Sterling Abrasives Division.—Plate-mounted grinding wheel.

STERLITH — Sterling Abrasives Division.—Grinding wheels.

STERMOUNT—Sterling Abrasives Division.—Small grinding wheels and points.

STEVENS—Frederic B. Stevens Inc.—Core and mold coatings, washes, partings; core pastes; sand additives.

STICK-FAST — Buckeye Products Co.—Core paste.

STICKTITE—Maxon Premix Burner Co.—Open port firing nozzle.

STONE—Stone Machinery Co.—Abrasive cut-off machine.

STOODITE—Stoody Co.—Hard-facing alloy rod.

STOODY—Stoody Co.—Hard-facing alloy rods.

STOOL KOTE—Thiem Products Inc.—Coatings.

STOPPER—Frederic B. Stevens Inc.—Patching iron cement.

STOWAY—Clark Equipment Co.—Fork lift truck.

STRADDLE TRUCK—Hyster Co.—Horizontal carrier.

STRAND — Franklin Balmar Corp.—Flexible shaft machines.

STRANDFLEX—Franklin Balmar Corp.—Flexible shaft machines.

STRESSCOAT—Magnaflux Corp.—Brittle coatings for stress analysis.

STRIPINCERT—Martin Engineering Co.—Core-box rubber sealing strip.

STRIPPER—General Foundry Service—Foundry flasks and jackets.

STROMAN—Stroman Furnace & Engineering Co.—Melting and holding furnaces; core ovens; oil burners; ladle heaters; centrifugal blowers; oil pump units.

STRONG—Strong, Carlisle & Hammond Co.—Steam traps; steam specialties.

STURTEVANT—Westinghouse Electric Corp.—Air handling equipment.

SUL-FREES—National Pigment Co. Inc.— Desulphurizer of steels.

SULTRON—American Silica Sand Co.—Cupola flux and desulphurizer.

SUPER—Harbinson-Walker Refractories Co.—Plastic fire brick.

SUPER—United States Rubber Co.—Hot-material conveyor belt.

SUPER ARMORPLATE—American Optical Co.—Lenses.

SUPER CYCLE—Chicago Pneumatic Tool Co.—Grinders.

SUPER DUTY — Deister Concentrator Co. — Concentrating table for recovery of foundry residues.

SUPER FURNAS-CRETE—Mexico Refractories Co.—Super quality castable refractory.

SUPER HILOSET—Mexico Refractories Co.—Super-quality high-temperature bonding mortar.

SUPER HYBOND—A. P. Green Fire Brick Co.—Super-duty plastic firebrick.

SUPER LONGLIFE—B. F. Goodrich Mfg. Co.—Conveyor belting.

SUPER MONO-FIBRIK—Mexico Refractories Co.—Super-quality plastic firebrick.

SUPER PARACOAT—Foundry Rubber Inc.—Rubber-base pattern finish.

SUPER SET—Stoller Chemical Co.—Dry binder for steel foundries.

SUPER-7—Allis-Chalmers Mfg. Co. — Multiple groove V-belts.

SUPER SIGHTS—The Boyer Campbell Co.—Magnifying lights.

SUPER SUCTION—National Super Service Co.—Heavy duty industrial suction cleaner.

SUPER SUCTION BY-PASS—National Super Service Co.—Inside filter industrial cleaner.

SUPERAC—General Refractories Co.—Super-duty firebrick.

SUPER-ANNEALSHOT — Metal Blast Inc. — Shot and grit.

SUPERBLAST—Alloy Metal Abrasive Co.—Abrasive blast materials.

SUPERCHILLS — Fanner Mfg. Co. — Internal chills.

SUPEREX—Jonhs-Manville—High-temperature insulation.

SUPERFLAKE—Superior Flake Graphite Co.—Graphite; colloidal graphite; greases and oils.

SUPERFLUX—Weaver Block Co.—Cupola flux.

SUPERHEAT—B. F. Goodrich Rubber Mfg. Co.—Steam hose.

SUPERMIX—General Electric Co., X-Ray Dept.—Film processing chemicals.

SUPER-PLASTIC—A. P. Green Fire Brick Co.—Super-duty plastic firebrick.

SUPER-PODIUM — Pitner & Hess — Foundry parting made from plant starches.

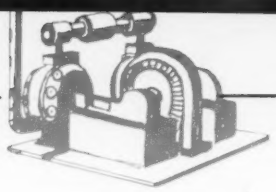
SUPERSOL—American Lacquer Solvents Co.—Lacquer thinner.

SUPERSPRAY—Lonn Mfg. Co.—Core blacking gun.

SUPERTHERM—J. O. Ross Engineering Corp.—High-pressure hot water heating system.

—For addresses of companies mentioned above, see list starting on page 184—

TRADE NAMES



SUPER-TITAN — Carpenter Brothers Inc. — Blasting nozzles.

SUPERTITE—Charles Engelhard Inc.—Ceramic thermocouple protection tubes.

SUPER-VENT—American Optical Co.—Goggles.

SUPERIOR—Clipper Mfg. Co.—Wet or dry masonry cutting abrasive blades.

SUPERIOR—Abrasive Metals Co.—Metal abrasive.

SUPERIOR — Freeman Supply Co. — Pattern supplies and plates.

SUPRALLOY—Charles Engelhard Inc.—Metal thermocouple protection tubes.

SUPREME—William F. Jobbins Inc.—Aluminum casting alloys.

SUPREME—Dayton Oil Co.—Core oils.

SURETT—Penola Oil Co.—Gear and wire rope lubricants.

SUREWELD—National Cylinder Gas Corp.—Arc welders and electrodes.

SURFACE—Surface Combustion Corp.—Melting and heat treating furnaces; industrial burners.

SURJ-SWITCH—Autotron Co.—Electronic control to detect current change in electrical circuit.

SURNIT — Pennsylvania Foundry Supply & Sand Co.—Double head and stem chaplets.

SUTTER—Sutter Products Co.—Core blowers; shell molding and special foundry machines.

SWARTWOUT—Foundry Equipment Co.—Industrial ovens.

SWARTWOUT-DEXTER—Swartwout Co.—Industrial ventilators.

SWEDE — Debevoise-Anderson Co. Inc. — Pig iron.

SWEDELAND—Debevoise-Anderson Co. Inc.—By-product foundry coke.

SWINDELL—Swindell-Dressler Corp.—Electric melting furnaces.

SWING TABLE — American Wheelabrator & Equipment Corp. — Airless abrasive blast cleaning machines.

SWINGSLINGER—Beardsley & Piper—Pivoted sandslinger for ramming small coreboxes or flasks.

SYNCARB—Ross-Tacony Crucible Co.—Carbon-bonded crucibles.

T

T-GRID—Electric Furnace Co.—Industrial heat treating furnaces.

T-HAT—B. F. McDonald Co.—Protective hat.

TD SEQUENCE—Ross Operating Valve Co.—Timing valves.

TABLAST—American Wheelabrator & Equipment Corp.—Airless abrasive blast cleaning machines.

TABLE-ROOM—Pangborn Corp.—Blast cleaning equipment.

TABOR—Tabor Mfg. Co.—Molding machines.

TABOR-BRASIVE—Tabor Mfg. Co.—Abrasive cutoff machines.

TAB-WELD—Electric Controller & Mfg. Co.—Resistors.

TACCONE — Taccone Pneumatic Foundry Equipment — Diaphragm molding machine and blow guns.

TACOMA—Ohio Ferro-Alloys Corp.—Ferroalloys.

TALIDE—Metal Carbides Corp.—Carbide-lined sand blast nozzle.

TAM—Titanium Alloy Mfg. Division—Alloys.

TAMASTONE—Tamms Industries Inc.—Pattern compound.

TAMMS—Tamms Industries Inc.—Plastic metal filler.

TAMMS NO. 90—Tamms Industries Inc.—Iron oxide for core sand.

TAMMS NO. 100 — Tamms Industries Inc. — cleaner for coreboxes and core blowing equipment.

TAMOLENE—Tamms Industries Inc.—Mold releasing wax.

TAMUL—Chas. Taylor Sons Co.—Refractory brick, shapes, cements, patches, ramming mixes.

TANNEWITZ—Tannewitz Works—Power saws.

TARGET—Robert G. Evans Co.—Blades for sawing refractories, vitreous clay products, etc.

TARGET ROLL-O-MATIC—Robert G. Evans Co.—Masonry saws.

TASIL—Chas. Taylor Sons Co.—Refractory brick, shapes, cements, patches, ramming mixes.

TAYCO—S. G. Taylor Chain Co.—Hooks.

TAYCO-40—Chas. Taylor Sons Co.—Silica cement.

TAYCOR—Chas. Taylor Sons Co.—Refractory brick, shapes, cements, patches, ramming mixes.

TAYLOR—American Engineering Co.—Underfeed stokers.

TAYLOR-MADE—S. G. Taylor Chain Co.—Sling and magnet chains.

TAYLOR ZIRCON—Chas. Taylor Sons Co.—Refractory brick, shapes, cements, patches, ramming mixes.

TELDAY—Telday Mfg. Co.—Steel boxes, wire baskets.

TELEBRINELLER—Teleweld Inc. — Portable brinell hardness tester.

TELECRANE—Mine Safety Appliances Co.—FM carrier crane communication system.

TELEPRINT—Howe Scale Co.—Electronic remote weight recorder.

TEMCO—Thermo Electric Mfg. Co.—Pyrometers.

TEMPIL PELLETS—Tempil Corp.—Temperature-indicating pellets.

TEMPILSTIKS—Tempil Corp. — Temperature-indicating crayons.

TEMPLIAQ—Tempil Corp.—Temperature-indicating liquid.

10-T—Frederic B. Stevens, Inc.—Tellurium-base core wash for chilling gray iron.

TENACITY—Hill & Griffiths Co., St. Louis Coke & Foundry Supply Co.—Core paste.

TENNANT—G. H. Tennant Co.—Power sweepers; industrial floor machine; heavy-duty scarifying machine.

TENNANTIZE—G. H. Tennant Co.—Technique for hardening, sealing and maintaining industrial floors.

TENNESSEE—Porter Warner Industries Inc.—Molding sands.

TENN-SIL—Tennessee Products & Chemical Corp.—Sand additive.

TENZALOY—Federated Metals Division—Aluminum ingot.

TERCOD—Electro Refractories & Abrasives Corp.—Silicon carbide brick.

TERESSTIC—Penola Oil Co.—Air compressor oils.

TERNALLOY — Apex Smelting Co. — High strength aluminum alloy ingot.

TERRE HAUTE—Republic Coal & Coke Co.—Foundry coke.

TEXDRIVE—Allis-Chalmers Mfg. Co.—V-belt sheaves.

TEXIRON—Allis-Chalmers Mfg. Co.—Cast iron sheaves.

TEXROPE—Allis-Chalmers Mfg. Co.—V-belt drive products.

TEXSLIDE—Allis-Chalmers Mfg. Co.—Motor bases for use with V-belt drives.

TEXSTEEL—Allis-Chalmers Mfg. Co.—Pressed steel sheaves.

TEXWAY — Allis-Chalmers Mfg. Co. — Motor bases for use with V-belt drives.

THERMALLOY—Electro-Alloys Div., American Brake Shoe Co. — Heat treating furnace trays, baskets, annealing pots, retorts, radiant tube assemblies.

THERMEX—Girdler Co.—Electronic core baking equipment.

THERMIX—Thermix Corp.—Ventilation engineering services.

THERMOBESTOS—Johns-Manville—High-temperature insulation.

THERMOBLOC — Prat-Daniel Corp. — Direct-fired industrial heaters.

THERMO-DECK—Allis-Chalmers Mfg. Co.—Electrically heated deck for vibrating screen.

THERM-O-FLAKE—Illinois Clay Products Co.—High-temperature insulation.

THERMOKOAT — Delta Oil Products Co. — Wash.

THER-MONIC—Induction Heating Corp.—Electronic core baking ovens; induction heating generators.

THERMOTOMIC—Pittsburgh Metals Purifying Co.—Moldable exothermic compound.

THERMOTOMIC "X"—Pittsburgh Metals Purifying Co.—Exothermic riser compound.

THERMOTRODE — Eutectic Welding Alloys Corp.—Electrode for arc welding; for instant heating.

THIEMOLD—Thiem Products Inc.—Core oils.

THOMPSON—S. Obermayer Co.—Clamps.

THOR—Thor Power Tool Co.—Portable air and electric tools.

THOR—Mexico Refractories Co.—Intermediate quality, stiff mud firebrick.

THOR—Borden Co.—Resin or plastic binders; release or parting agents; core pastes; shell molding resins.

3M — Minnesota Mining & Mfg. Co.—Coated abrasives.

THRUSTFRE—Pennsylvania Pump & Compressor Co.—Centrifugal pump.

TIME-GUIDE—Haylco Controls Corp.—Timer for sand mixer.

TIMEMASTER — National Engineering Co. — Automatic sand mixing control equipment.

TIPIT—Manning, Maxwell & Moore Inc.—Tipping sling.

TITAN—Detroit Hoist & Machine Co.—Electric hoist.

TITAN—Besly-Welles Corp. — Abrasive wheel discs; snagging wheels.

TOCCO—Ohio Crankshaft Co.—Electric induction melting furnaces.

TOLEDO—Toledo Scale Co.—Scales.

TONAWANDA G-IRON—American Radiator & Standard Sanitary Corp.—Foundry and malleable pig iron.

TONKA—Lee Rubber & Tire Corp.—Water hose.

TOOL-OM-ETER — New Jersey Meter Co. — meter for measuring flow of compressed air.

TOOLPLASTIK—Rezolin Inc.—Phenolic tooling resin.

TOP-BOND—United Oil Mfg. Co.—Core and mold spray.

TOP HAT—Continental Industrial Engineers Inc.—Annealing furnaces.

TOP-WEAR—Steelblast Abrasives Co.—Steel shot.

TORCHWELD—National Cylinder Gas Corp.—Pad washing torch; gas welding and flame cutting equipment.

TORIT—Torit Mfg. Co.—Unit type dust collectors.

TORNADO—Breuer Electric Mfg. Co.—Vacuum cleaners; floor scrubbing and polishing machines; portable electric blowers; dust collectors.

TORRID TEMP—National Foundry Sand—Plastic firebrick.

TOUSEY—Tousey Varnish Co.—Casting sealers.

TOWMOTOR — Towmotor Corp. — Fork lift trucks, tractors and accessories.

TOWVEYOR—Jervis B. Webb Co.—Under-floor conveyor.

TRACKLESS TRAIN—Mercury Mfg. Co.—Tractor trailer system of handling material.

TRACTO-LIFT — Tracto Lift Co. — Fork lift trucks; hydraulic scoops.

TRACTO-LOADER TL-10—Tractomotive Corp.—Rubber tired ¾-yard loader.

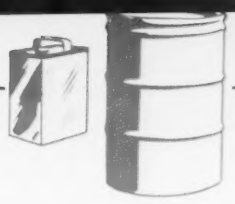
TRAMBEAM—Whiting Corp.—Light cranes; crane runways; monorail tracks.

TRANSITE — Johns-Manville — Pallets, core plates and slip jackets.

TRANSO—LeRoi Co.—Loader.

TRANSO—C. R. Daniels Inc.—Power-transmission belting.

TRANSPORT—Factory Service Co.—Semi-live skid.



TRAVELATOR—Northern Engineering Works—Bridge crane drive unit.

TRAVELOADER—National Engineering Co.—Traveling bucket loader (or sand handling equipment).

TRAVELOADER—Baker-Lull Corp.—Side loading lift truck.

TRI-CLAD—General Electric Co., Schenectady—Electric motors.

TRI-COTE—Frederic B. Stevens Inc.—Refractory core and mold coating for iron and steel.

TRI-FLUX—Wolfe-Kote Co.—Soldering flux.

TRI-LOK—Dravo Corp.—Open steel flooring.

TRION — Trion Inc. — Electronic air cleaning equipment.

TRIPLACT—Eastern Clay Products Dept.—Special bonding clay.

TRIPLEX—Sta-Warm Electric Co.—Electric wax pots.

TRIUMPH AA—Jas. A. Murphy & Co. Inc.—Small air line separator tilter.

TROFF-O-MATIC—Pekay Machine & Engineering Co.—Spill-proof belt conveyor.

TROJAN—Detroit Hoist & Machine Co.—Monorail tractor.

TROJAN LOADSTER—Contractors Machinery Co. Inc.—Shovel type loaders.

TRUCK-MAN — Knickerbocker Co. — Skid-lift and high-lift power-operated trucks.

TRULINE BINDER—Hercules Powder Co.—Core and molding sand resin binder.

TRUCLOADER—Clark Equipment Co.—Fork lift truck.

TRUCTRACTOR—Clark Equipment Co.—Industrial trucks (tip, dump, stake).

TRU-MELT — North State Pyrophyllite Co. — Cupola.

TRUSCOR — Chas. A. Krause Milling Co. — Cereal core and facing binder.

TRUSS RAIL—American Monorail Co.—Fabricated rail section.

TRU-STEEL—American Steel Abrasives Co., Pittsburgh Crushed Steel Co.—Steel shot.

TUBE-VEYOR—Prab Conveyors Inc.—Tubular conveyor.

TUFFY—Union Wire Rope Corp.—Wire rope for crane hoists.

TUFFY—United States Safety Service Co.—All-plastic apron.

TUG—Mercury Mfg. Co.—Medium-duty tractor.

TUGIT—Manning, Maxwell & Moore Inc.—Hoists.

TUMBLAST—American Wheelabrator & Equipment Corp.—Airless abrasive blast cleaning machines.

TURBO-DRIVE—Crane Co.—Pneumatic conveyors.

TURNER—Factory Service Co.—System of materials handling.

TURN-STYLE—Pangborn Corp.—Airless blast cleaning equipment employing two work tables.

TURTLE—Flexible Steel Lacing Co.—Conveyor belt repair fastener.

20TH CENTURY — Cleveland Metal Abrasive Co.—Shot and grit.

TWIN-MOTOR—Standard Electrical Tool Co.—Snagging grinder.

TWIN-TABLE — American Wheelabrator & Equipment Corp.—Airless abrasive blast cleaning machines.

TYCO—Tyler Metal Products Co.—Shell molding machine.

TYKOR—Swan-Finch Oil Corp.—Liquid core binder.

TYPE 50—B. F. Goodrich Rubber Mfg. Co.—Air hose.

TYPE 81—B. F. Goodrich Rubber Mfg. Co.—Water suction water hose.

TYPE 88—B. F. Goodrich Rubber Mfg. Co.—Air hose.

U

U. S.—Emerson Electric Mfg. Co.—Portable grinders, buffers, sanders, drills; floor grinders and buffers.

U. S.—U. S. Smelting Furnace Co.—Rotary furnaces for nonferrous metal melting and smelting.

U.S.—United States Rubber Co.—Hose; hot-material conveyor belt; v-belts

U. S.—U. S. Air Compressor Co.—Couplings; air compressors; lubricating equipment.

U. S. NO. 8—U. S. Graphite Co.—Graphitizing inoculant for gray iron ladle additions.

U. S. NO. 205—U. S. Graphite Co.—Graphite lubricant.

U. S. NO. 866—U. S. Graphite Co.—Hot top and riser insulation.

U. S. G.—U. S. Graphite Co.—Carbon brushes for rotating electrical equipment.

U-CAST-IT—Keystone Refractories Co.—Moldable monolithic refractory.

ULTRA AIRE FILTER—Mine Safety Appliances Co.—Space filter for air purification.

UNIDOR—Baker-Perkins Inc.—Batch type core and molding sand mixers.

UNIFLEX—Universal Vibrating Screen Co.—Light-duty portable screens.

UNIFLEX—Uniflex Cable Co.—Electric jumpers, shunts; water-cooled cable; conductors; induction furnaces.

UNI-FLO — Claude B. Schneible — Hoods for shakeout, knockout and pouring operations.

UNIFLO—W. W. Sly Mfg. Co.—Sandblast nozzles.

UNILINE—Robinson Clay Products Co.—Ladle lining refractory.

UNIMIXER—Patterson Foundry & Machine Co.—Drives; liquid mixers.

UNION—Linde Air Products Co.—Carbide.

UNIONMELT—Linde Air Products Co.—Automatic welding apparatus and supplies.

UNIPOWER—Patterson Foundry & Machine Co.—Mixer drives.

UNISTAGE—Schramm Inc.—General line compressors.

UNIT—Unit Crane & Shovel Corp.—Mobile, truck and crawler type cranes.

UNITAIR—Joy Mfg. Co.—Air compressor.

UNITITE—Hanna Engineering Works—Hand valves.

UNIVERSAL—Foundry Supplies Mfg. Co.—Sand riddle; sand fineness test sifter.

UNIVERSAL — Universal Filter Co. — Compresed air line filter.

UNIVERSAL — Universal Engineering Co. — Flask pins and bushings.

UNIVERSAL—Chas. H. Milles Foundry Co.—Ingot mold coating.

UNIVERSAL—E. W. Buschman Co.—Cable conveyor.

UNIVERSAL—Universal Vibrating Screen Co.—Heavy-duty screens.

UNIVIBE—Universal Vibrating Screen Co.—Portable riddles.

UNI-WASH—Newcomb-Detroit Co. Inc.—Dust collectors.

UPANOVER—Jacob House & Sons—Lifter and dumper.

USCO—U. S. Reduction Co.—Aluminum alloy ingot; deoxidizing aluminum; fluxes; cast aluminum plate; zinc-base die casting alloys; die casting hardwares.

UTAH—Allis-Chalmers Mfg. Co.—Electromagnetic vibrating feeders, screens, conveyors, driers.

UTILITRUC — Clark Equipment Co. — Fork lift truck.

UTILITY—S. Obermayer Co.—Binder and core paste.

UTILITY — National Engineering Co. — Sand conditioning unit.

V

V-5 ALLOY—Vanadium Corp. of America—Stabilizer of section sensitivity of iron castings.

V 907—Jas. A. Murphy & Co. Inc.—Small air line aftercooler.

V-G—V-G Flask & Fitting Co.—Snap flasks; bands; presser boards; pin assemblies; flask hardware; aluminum bottom boards.

V-G NEVABURN—V-G Flask & Fitting Co.—Bottom boards.

V H B—Calumet Steel Castings Corp.—Vibrator hole bushings.

VALVENT—Swartwout Co.—Industrial ventilators.

VAN CALORIA—Penola Oil Co.—Conveyor lubricants.

VANCORAM—Vanadium Corp. of America—Alloys; metals; chemicals.

VARI-PITCH—Allis-Chalmers Mfg. Co.—V-belt sheaves and speed changers.

VARI-PULSE—Allis-Chalmers Mfg. Co.—Non-blinding device for electric vibrating screens.

VARI-SET—Eclipse Fuel Engineering Co.—Adjustable air-gas mixers.

VASSAR—Sargent Sand Co.—Bank sand.

VEGA — Harbison-Walker Refractories Co. — Silica brick.

VENANGO—Industrial Silica Corp.—Natural semi-bonded silica sand for medium to heavy iron or steel castings.

VENTITE—Maxon Premix Burner Co.—High-pressure gas burner.

VENTURA—American Blower Corp.—Propeller fans.

VENTURAFIN—American Blower Corp.—Unit heaters.

VERSAVEYOR—The Belt Corp.—Package conveyor.

VERTI-LIFT—R. C. Mahon Co.—Core baking ovens.

VERTIMELT—Grindle Corp.

VIBRA-DRAW—Federal Foundry Supply Co.—Core drawing machine.

VIBRA-FEEDER—Hewitt-Robins Inc.—Vibrating feeder.

VIBRA-FLOW—Syntron Co.—Electromagnetic vibratory feeder.

VIBRA-MOUNT — American Felt Co. — Felt mounts for machines.

VIBRA-TAKS—Martin Engineering Co.—Reed type vibration indicator.

VIBRO-FEEDER—Kaysing Iron Works Inc.—Vibrating feeder.

VIBROLATOR—Martin Engineering Co.—Rotary pneumatic vibrator.

VIBRON—Burgess-Sterbentz Corp.—Refractory gun; pneumatic vibrators.

VIBRO-SCREEN—Kaysing Iron Works Inc.—Vibrating screen.

VIBRO-VEYOR—Kaysing Iron Works Inc.—Vibrating conveyor.

VICTOR—Hickman, Williams & Co.—Ferrophosphorus.

VICTORY—United Metals Refining Co.—Babbitt.

VICTORY—Whitehead Bros. Co.—Core compound.

VICTORY — Victory Pattern Shop — Patterns and models.

VICTORY—Hill & Griffiths Co.—Core paste.

VIENER—Hyman Viener & Sons—Nonferrous Metals and alloys.

VIKING—Viking Steel Co.—Core wire and rods.

VIKING—Mexico Refractories Co.—Intermediate quality, dry press firebrick.

VILOCO — Viloco Railway Equipment Co. — Sand dryers.

VIM—E. F. Houghton & Co.—Leather packings.

VINCENT—Vincent Steel Process Co.—Grinding wheel dressers and cutters.

VIRGO—Hooker Electrochemical Co.—Fused salt for metal descaling and for desanding, degraphitising castings.

VI-SPEED—Van Products Co.—Air-operated bench and machine vises; air operated presses; compressed air dehumidifiers; filters.

VOLCLAY — American Colloid Co. — Western bentonite.

VOLMEX — U. S. Graphite Co. — Ingot mold wash.

W

WV SEQUENCE—Ross Operating Valve Co.—Timing valves.

TRADE NAMES

WADSWORTH—Wadsworth Equipment Co.—Core extruding machines; twisted steel gaggers; steel core plates; core trays; core cut-off and coning machines.

WAGNER — Wagner Electric Corp. — Electric motors and transformers.

WALKER-TURNER—Walker & Turner Co.—Wood and metal working machines.

WALLACE—J. D. Wallace & Co.—Woodworking machinery.

WARCO—Walsh Refractories Corp.—Fire brick.

WARREN NO. 7—Warren Sand Co.—Light molding sand.

WATERLOX — Empire Varnish Co. — Casting sealer.

WEAR-PROOF — Claude B. Schneible Co. — Pumps to handle liquids containing abrasive material.

WEAR-RESIST—Pangborn Corp.—Alloy lining plates for blast cleaning equipment.

WEATHER-ADE—Empire Varnish Co.—Natural exterior finish.

WEBB—Jervis B. Webb Co.—Conveyors.

WEDRON—Wedron Silica Co.—White silica sand; silica flour.

WELD-BILT — West Bend Mfg. Co. — Lift trucks; skid platforms; elevators; portable floor-to-floor and dumb waiters; storage racks; special material handling equipment.

WELD MASTER—Modern Engineering Co.—Welding torch.

WELLMADE—Wellman Bronze & Aluminum Co.—Foundry patterns.

WELLMAN—Wellman Engineering Co.—Open-hearth charging machine.

WELLMAN—Wellman Products—Cast aluminum sign letters; pattern letters.

WELLS—Wells Mfg. Corp.—Horizontal metal cutting band saws.

WEMCO—Western Metal Co.—Brass, bronze and aluminum ingot.

WERSMITH—Werner G. Smith Inc.—Core oils.

WESTERN—Western Materials Co.—Core and sand blast sands; fire and bond clays; bentonite.

WESTINGHOUSE — Westinghouse Electric Corp., Electronic & X-Ray Div.—X-ray equipment.

WESTONITE—Eastern Clay Products Dept.—Special bonding clay.

WHEELABRATOR—American Wheelabrator & Equipment Corp.—Airless abrasive blast cleaning machines.

WHEELABRATOR STEEL SHOT—American Wheelabrator & Equipment Corp.—Blast cleaning and peening abrasive.

WHEELAPEEN — American Wheelabrator & Equipment Corp.—Shot peening machines.

WHEEL-IT — E. W. Buschman Co. — Hand trucks.

WHIRL-AIR-FLOW—Gerwin Industries—Pneumatic sand conveyor.

WHIRLEX—Fly Ash Arrestor Corp.—Dust collectors; fans, blowers.

WHIRLMIX—Federal Foundry Supply Co.—Sand mixer.

WHIRLOUT—Swartwout Co.—Industrial ventilators.

WHITE KING—Pacific Graphite Co. Inc.—Non-silica parting.

WHITE VELVET — Thiem Products Inc. — Mudding compounds.

WHITING—Whiting Corp.—Cupolas; charging equipment; air furnaces; convertors; electric furnaces; ladles; hoists; tumbling mills; annealing ovens.

WILKERSON — Wilkerson Corp. — Automatic line separators; automatic tank drains; manually-operated line separators; air governor.

WILKINSON—Wilkinson Equipment & Supply Corp.—Core oil pump and meter system.

WILL—Arthur E. Will—Wood and metal pattern equipment.

WILLIAMS—Wellman Engineering Co.—Clamshell buckets.

WILLSON-WELD — Willson Products Inc. — Welding glass.

WIRE-BOND—George H. Bullard Co.—Safety cut-off wheel.

WISE—Henry H. Wise Co.—Cut-off saws and wheels.

WOLVERINE—Wolverine Foundry Supply Co.—Core oil; parting; core paste.

WONDER—Federal Foundry Supply Co.—Wire cutter.

WOOD—Wood Shovel & Tool Co.—Shovels; scoops; wheelbarrows.

WOOD-LOK—National Adhesives Div.—Patternmaking glue.

WOPPER JAW—Products Engineering Co.—Slip jackets.

WORK-O-MATIC—Union Metal Mfg. Co.—Industrial handling boxes; positioning stand; gravity-fed hopper.

WORTHINGTON — Worthington Corp. — Air compressors; pumps.

WRIGHT — Wright Hoist Division — Chain hoists; trolleys; overhead traveling cranes.

WRIGHT-SAFEWAY—Wright Hoist Division—Chain hoists.

WW CO—Robinson Clay Products Co.—Fire brick.

WYANDOTTE—Hickman, Williams & Co.—Foundry coke.

WYCO—Wyzenbeek & Staff Inc.—Flexible shaft machines; saws; hole cutters.

WYCOFLEX—Wyzenbeek & Staff Inc.—Flexible shaft grinders.

WYCOMATIC—Wyzenbeek & Staff Inc.—Variable-speed flexible shaft machine.

WYNN — General Refractories Co. — Fireclay brick.

X

X-BINDER—Pacific Graphite Co. Inc.—Facing additive.

X-SERIES—Logan Co.—Bearing for conveyor rolls.

XRD—General Electric Co., X-Ray Dept.—X-ray diffraction apparatus.

XRP—General Electric Co., X-Ray Dept.—X-ray protective material (sheeting, foil, etc.).

XSA—North American Mfg. Co.—Excess air burners for gas, oil or dual-fuel.

XXXX—Asbury Graphite Mills Inc.—Plumbago for green sand work.

XACTLINE—Claud S. Gordon Co.—Input controller.

XACTO—Bowser Inc.—Meter for measuring core oil.

XASTEMP—Claud S. Gordon Co.—Hand pyrometers.

X-RAY FILMACHINE—Pako Corp.—Automatic x-ray film processing machine.

X-RAY FILMTANX—Pako Corp.—Manual x-ray film processing tanks.

Y

YAK—Mercury Mfg. Co.—Fork truck 4000 lb capacity.

YALE—Yale & Towne Mfg. Co.—Industrial power trucks; hoists.

YANK—Mercury Mfg. Co.—Fork truck 6000 lb capacity.

YARDLIFT—Clark Equipment Co.—Fork lift truck.

YELLOW STRAND—Broderick & Bascom Rope Co.—Wire rope.

YOUNG BROTHERS—Foundry Equipment Co.—Industrial ovens.

YOUNGSTOWN—Electric Controller & Mfg. Co.—Crane hoist limit stop.

Z

Z33—Apex Smelting Co.—Aluminum alloy ingot.

Z-KOAT—Delta Oil Products Co.—Wash containing zirconium.

ZZ-KOAT—Delta Oil Products Co.—All-zirconium type wash.

ZEPHAIR—Hunter Fan & Ventilating Co.—Ventilating equipment.

ZERO—Standard Fuel Engineering Co.—Refractories.

ZeVeSCAL—Calumet Steel Castings Corp.—Chrome-ferrous alloys.

ZIG-ZAG—Richards-Wilcox Mfg. Co.—Lightweight continuous power conveyors.

ZIP - LIFT — Harnischfeger Corp. — Electric hoist.

ZIRCON FLOUR — Orefraction, Inc. — Zircon sand milled to specific finenesses.

ZIRCON SAND—Orefraction, Inc.—Granular foundry zircon.

ZIRCONITE—Titanium Alloy Mfg. Division—Sand; flour and wash.

ZIRCONO—M. A. Bell Co.—Zircon-base core and mold wash.

ZYGLO—Magnaflux Corp.—Fluorescent penetrant inspection.

Names and Addresses of Foundry Suppliers

ABRASIVE METALS CO., 26th St. & B. & O. R. R., Pittsburgh 22.

ACCURATE MATCH PLATE CO., 1847 W. Carroll St., Chicago 12.

ACHESON COLLOIDS CO., Port Huron, Mich.

ACME ABRASIVES, 24200 Marmon, Centerline, Mich.

ACME ALUMINUM ALLOYS, INC., 232 Findlay St., Dayton 3, Ohio.

ACME FOUNDRY CO., 2503—22nd St., Detroit 16.

ACME RESIN CORP., Forest Park, Ill.

ADAMS CO., 100 E. 4 St., Dubuque, Iowa.

R. P. ADAMS CO., 227 E. Park Dr., Buffalo 17.

ADDISON SEMMES CORP., 1800 Thurston Ave., Racine, Wis.

ADRIAN PRODUCTION TOOL CO., Adrian, Mich.

AERODYNE DEVELOPMENT CO., 879 Addison Rd., Cleveland 3.

AEROQUIP CORP., East St., Jackson, Mich.

AEROVENT FAN CO., 710 E. Ash St., Piqua, O.

AIMES CO., INC., 1740 E. 12th St., Cleveland 14.

AIR REDUCTION SALES CO., 60 E. 42nd St., New York 17.

AJAX ELECTRIC FURNACE CORP., 1108 Frankford Ave., Philadelphia 25.

AJAX ELECTROTHERMIC CORP., Ajax Park, Trenton 5, N. J.

AJAX ENGINEERING CO., Lalor & Hancock Sts., Trenton 7, N. J.

AJAX FLEXIBLE COUPLING CO., INC., Westfield, N. Y.

AJAX TOOL WORKS, INC., 3000 W. Chicago Ave., Chicago 22.

ALABAMA BY-PRODUCTS CORP., P.O. Box 354, Birmingham 1.

ALL STEEL WELDED TRUCK CO., 1149 Railroad Ave., Rockford, Ill.

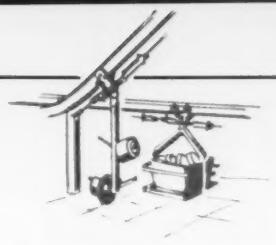
ALLEN INDUSTRIAL PRODUCTS, 97 Liberty St., Battle Creek, Mich.

ALLIS CHALMERS MFG. CO., 1126 S. 70 St., Milwaukee 1.

ALLOY METAL ABRASIVE CO., 311 W. Huron St., Ann Arbor, Mich.

ALL-STATE WELDING ALLOYS CO., 249 Ferris, White Plains, N. Y.

ALPHA-LUX CO., 155 John St., New York 7.



ALTER CO., 1701 Rockingham Rd., Davenport, Iowa.

ALVEY-FERGUSON CO., 73 Disney St., Cincinnati 9.

ALVIN PRODUCTS, INC., 20 Houghton St., Worcester 4, Mass.

AMERICAN AIR FILTER CO., Louisville 8, Ky.

AMERICAN ALLOYS CORP., Waltower Bldg., Kansas City 6E, Mo.

AMERICAN BILDROK CO., 22 W. Monroe St., Chicago 3.

AMERICAN BLOWER CORP., 8111 Tireman St., Detroit 4.

AMERICAN BRAKE SHOE CO., 97 Humboldt St., Rochester 9, N. Y.

AMERICAN BRIDGE DIV., United States Steel Corp., 525 Wm. Penn Pl., Pittsburgh 30.

AMERICAN CAR & FOUNDRY CO., 30 Church St., New York 7.

AMERICAN CHAIN & CABLE CO. INC., Wilkes-Barre, Pa.

AMERICAN CHAIN DIV., American Chain & Cable Co. Inc., York, Pa.

AMERICAN CLAY FORMING CO., Tiffin, O.

AMERICAN COLLOID CO., Merchandise Mart, Rm. 813, Chicago 54.

AMERICAN CONVEYOR CO., 1115 W. Adams St., Chicago 7.

AMERICAN CYSTOSCOPE MAKERS INC., 129 E. 78th St., New York.

AMERICAN ENGINEERING CO., 2484 Aramingo St., Philadelphia 25.

AMERICAN FELT CO., 24 Glenville Rd., Glenville, Conn.

AMERICAN FIRE CLAY & PRODUCTS CO., Western Reserve Rd., P.O. Box 157, Canfield, O.

AMERICAN GUM PRODUCTS CO., 500 Fifth Ave., New York 36.

AMERICAN HOIST & DERRICK CO., 63 S. Robert, St. Paul 1.

AMERICAN LACQUER SOLVENTS CO., Phoenixville, Pa.

AMERICAN LAVA CORP., Chattanooga 5, Tenn.

AMERICAN METALLURGICAL PRODUCTS CO., 3600 Forbes St., Pittsburgh 13.

AMERICAN MONORAIL CO., 13107 Athens Ave., Cleveland 7.

AMERICAN OPTICAL CO., 44 Mechanic St., Southbridge, Mass.

AMERICAN RADIATOR & STANDARD SANITARY CORP., TONAWANDA IRON DIV., North Tonawanda, N. Y.

AMERICAN REFRACTORIES & CRUCIBLE CORP., North Haven, Conn.

AMERICAN SILICA SAND CO., Central Life Bldg., Ottawa, Ill.

AMERICAN STEEL ABRASIVES CO., Galion, O.

AMERICAN STEEL DREDGE CO. INC., WAYNE CRANE DIV., 2511 Taylor St., Ft. Wayne, Ind.

AMERICAN TANK & FABRICATING CO., 2284 Scranton Rd., Cleveland 13.

AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind.

ANDERSON PATTERN INC., Muskegon, Mich.

ANDREA MFG. CO., 180 N. Wacker Dr., Chicago 6.

ANGELL NAIL & CHAPLET CO., 4580 E. 71 St., Cleveland 5.

ANHEUSER-BUSCH INC., 721 Pestalozzi St., St. Louis 17.

ANSUL CHEMICAL CO., Marinette, Wis.

APEX SMELTING CO., 2537 W. Taylor St., Chicago 12.

AQUADYNE CORP., 441 Lexington Ave., New York 17.

ARCAIR CO., 2614 Burwell St., Bremerton, Wash.

ARCHER-DANIELS-MIDLAND CO., 2191 W. 110 St., Cleveland 2.

ARMOUR & CO., N. Benton Rd., Alliance, O.

ARO EQUIPMENT CO., Bryan, O.

ARROW TOOLS INC., 1900 S. Kostner, Chicago 23.

ASBURY GRAPHITE MILLS INC., Asbury, N. J.

ATLANTIC ABRASIVE CORP., South Braintree, Mass.

ATLANTIC SAW MFG. CO., 157 Brewery St., New Haven, Conn.

ATLAS PLASTIC & ALUMINUM PRESSURE PLATE CO., 4813 N. 124 St., Butler, Wis.

AUTOMOTIVE PATTERN CO., 18840 John R St., Detroit 3.

AUTOTRON CO., P.O. Box 722, Danville, Ill.

AYERS MINERAL CO., Zanesville, O.

B

BABCOCK & WILCOX CO., 161 E. 42nd St., New York 17.

BADGER PERLITE PRODUCTS CO., 3101 W. Mill Rd., Milwaukee 9.

WM. M. BAILEY CO., 1221 Banksville Blvd., Pittsburgh 16.

BAKELITE CO., DIV. OF UNION CARBIDE & CARBON CORP., 300 Madison Ave., New York 17.

BAKER-LULL CORP., 314 W. 90 St., Minneapolis 20.

BAKER-PERKINS INC., 1000 Hess St., Saginaw, Mich.

BAKER-RAULANG CO., 1250 W. 80 St., Cleveland 2.

BAKOR OIL CO., 82 E. Main St., Chicago Hts., Ill.

BALDOR ELECTRIC CO., 325 W. Huron, Chicago 10.

FRANKLIN BALMAR CORP., 60 E. 42nd St., New York 17.

BARBER-GREENE CO., 400 N. Highland Ave., Aurora, Ill.

W. O. BARNES CO., 1297 Terminal Ave., Detroit 14.

BAROID SALES DIV., NATIONAL LEAD CO., 80 E. Jackson Blvd., Chicago 4.

BARRETT DIVISION, ALLIED CHEMICAL & DYE CORP., 40 Rector St., New York 6.

C. O. BARTLETT & SNOW CO., 6200 Harvard Ave., Cleveland 5.

BASIC REFRACTORIES INC., 845 Hanna Bldg., Cleveland 15.

BAUSCH & LOMB OPTICAL CO., 637 St. Paul St., Rochester, N. Y.

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

BEARDSLEY & PIPER DIV., PETTIBONE MULLIKEN CORP., 2424 N. Cicero Ave., Chicago 39.

BEDFORD FOUNDRY & MACHINE CO., Bedford, Ind.

BEDFORD TOOL & FORGE CO., 22 Interstate St., Bedford, O.

M. A. BELL CO., 217 Lombard St., St. Louis 2.

BELLOWS CO., 230 W. Market St., Akron 3.

BELMONT SMELTING & REFINING WORKS INC., 330 Belmont Ave., Brooklyn 7, N. Y.

BELT CORP., Orient, O.

HARVEY P. BERTRAM CO., 1008 W. 9th St., Cincinnati 3.

BERYLLIUM CORP., Reading, Pa.

BESLY-WELLES CORP., Beloit, Wis.

BIG JOE MFG. CO., 900 W. Jackson Blvd., Chicago 7.

BIN-DICATOR CO., 13946 Kercheval, Detroit 15.

BINKS MFG. CO., 3124 W. Carroll Ave., Chicago 12.

BLACK PRODUCTS CO., 13513 South Calumet, Chicago 27.

BLACK, SIVALLS & BRYSON INC., 7500 E. 12th St., Kansas City 6, Mo.

BLASTCRETE EQUIPMENT CO., 11154 Santa Monica Blvd., Los Angeles 25.

BLAW-KNOX CO., Blawnox, Pa.

BLOOMSBURY GRAPHITE CO., Bloomsbury, N. J.

BOHN ALUMINUM & BRASS CO., MICHIGAN SMELTING & REFINING DIV., 7885 Joseph Campeau, Detroit 11.

BORDEN CO., CHEMICALS DIV., 350 Madison Ave., New York 17.

BOSTON WOVEN HOSE & RUBBER CO., 29 Hampshire St., Cambridge 39, Mass.

BOTFIELD REFRACTORIES CO., 786 S. Swanson St., Philadelphia 47.

BOWSER INC., 1300 Creighton Ave. E., Ft. Wayne 2, Ind.

BOYER CAMPBELL CO., 6540 Antoine St., Detroit 2.

BRADFORD MACHINE TOOL CO., 657 Evans St., Cincinnati 4.

BRADLEY WASHFOUNTAIN CO., 2203 W. Michigan Ave., Milwaukee 1.

BRADY CONVEYORS CORP., 20 W. Jackson Blvd., Chicago 4.

BRANFORD CO., 130 Chestnut St., New Haven 7, Conn.

BREUER ELECTRIC MFG. CO., 5100 N. Ravenswood, Chicago 40.

BRODERICK & BASCOM ROPE CO., 4203 N. Union, St. Louis 15.

BROOKS & PERKINS INC., 1946 W. Fort, Detroit 16.

BROOKS EQUIPMENT & MFG. CO., 408 Davenport Rd., Knoxville 15, Tenn.

BROWN FINTUBE CO., Elyria, O.

BRUMMELER STEEL PRODUCTS CORP., 1415 Ionia St. S.W., Grand Rapids 7, Mich.

BRUNDAGE CO., N. Park & Homer St., Kalamazoo, Mich.

BUCKEYE PRODUCTS CO., 7072 Vine St., Cincinnati 16.

BUCKEYE TOOLS CORP., 29 W. Apple St., Dayton 1, O.

BUEHLER LTD., 2120 Greenwood Ave., Evanston, Ill.

BUFFALO FORGE CO., 490 Broadway, Buffalo 5.

BUFFALO PATTERN WORKS INC., 830 Hertel Ave., Buffalo 16.

GEORGE H. BULLARD CO., Westboro, Mass.

BURDETT MFG. CO., 3433 W. Madison, Chicago 7.

BURGESS-STERBENTZ CORP., 3790 W. 150th St., Cleveland 11.

BURR ALUMINUM, Burr Oaks, Mich.

E. W. BUSCHMAN CO., Clifton & Spring Grove Aves., Cincinnati 32.

BUTLER BIN CO., CARSCOOP DIV., Waukesha, Wis.

C

CABLE-LINK CORP., 20175 John R St., Detroit 3.

CALDWELL CO., 1830 Camp Ave., Rockford 2, Ill.

CALUMET STEEL CASTINGS CORP., 1636 Summer St., Hammond, Ind.

CAMPBELL-HAUSFELD CO., Harrison, O.

CANTON PRODUCTS CO., P.O. Box 981, Canton 1, O.

CAPEWELL MFG. CO., 60 Governor St., Hartford 2, Conn.

CARBOLINE CO., 331 Thornton Ave., St. Louis 19.

CARBOLOY DEPT., GENERAL ELECTRIC CO., 11177 E. 8 Mile, Detroit 32.

CARBORUNDUM CO., Niagara Falls, N. Y.

CARGILL-DETROIT CO., 2254 Cole Ave., Birmingham, Mich.

CARL-MAYER CORP., 3030 Euclid Ave., Cleveland 15.

EDWIN S. CARMAN INC., 1643 Lee Rd., Cleveland 18.

CARPENTER BROTHERS INC., 606 W. Wisconsin Ave., Milwaukee 3.

CARRIER CONVEYOR CORP., Frankfort Ave. at Clifton, Louisville 6.

CARTER PRODUCTS CO. INC., 30 Ionia, S.W., Grand Rapids 2, Mich.

CAST MASTER INC., 2123 Hamilton Ave., Cleveland 14.

CATALIN CORP. OF AMERICA, 1 Park Ave., New York 16.

CATERPILLAR TRACTOR CO., Peoria, Ill.

CEDAR HEIGHTS CLAY CO., Oak Hill, O.

CEMENT GUN CO., Allentown, Pa.

CENTRAL PATTERN CO., 134-136 South Front St., Quincy, Ill.

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13.

CENTRIFUGAL CASTING MACHINE CO., P.O. Box 947, Tulsa, Okla.

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3.

CERRO DE PASCO CORP., 40 Wall St., New York.

CHAIN BELT CO., Milwaukee 1.

CHELSEA FAN & BLOWER CO., 639 South Ave., Plainfield, N. J.

CHICAGO EYE SHIELD CO., 2300 Warren Blvd., Chicago 12.

CHICAGO MFG. & DISTRIBUTING CO., 1928 W. 46 St., Chicago 9.

CHICAGO PNEUMATIC TOOL CO., 6 E. 44th St., New York 17.

CHICAGO RUBBER CO., 2620 N. Clybourn, Chicago 14.

CHICAGO WHEEL & MFG. CO., 1101 W. Monroe St., Chicago 7.

CHISHOLM-MOORE HOIST CORP. and COLUMBUS-McKINNON CHAIN CORP., Fremont Ave., Tonawanda, N. Y.

CHRISTIANSEN CORP., 210 S. Marion, Oak Park 1, Ill.

CINCINNATI ELECTRICAL TOOL CO., 2684 Madison Rd., Cincinnati 8.

CINCINNATI MILLING PRODUCTS DIV., CINCINNATI MILLING & GRINDING MACHINES INC., Cincinnati 9.

CITIES SERVICE OIL CO., 20 N. Wacker Dr., Chicago 6.

CITY PATTERN FOUNDRY & MACHINE CO., 1165 Harper Ave., Detroit 11.

CLARK CAST STEEL CEMENT CO., P.O. Box 21, Wilmington, Del.

CLARK EQUIPMENT CO., Battle Creek, Mich.

CLARK INSTRUMENT, INC., 10200 Ford Rd., Dearborn, Mich.

CLAYTON-SHERMAN ABRASIVES CO., 3896 Lonyo Rd., Detroit 10.

CLAYTON SILICA CO., 405 Granby Bldg., Cedar Rapids, Iowa.

CLEARFIELD MACHINE CO., Clearfield, Pa.

CLECO DIV. OF REED ROLLER BIT CO., P.O. Box 2119, Houston, Tex.

CLEVELAND AUTOMATIC MACHINE CO., 4932 Beech St., Cincinnati.

CLEVELAND CHAIN & MFG. CO., Broadway and Chaincraft Rd., Cleveland 5.

CLEVELAND CHAPLET & MFG. CO., 26470 Lakeland Blvd., Cleveland 23.

CLEVELAND CRANE & ENG. CO., Wickliffe, O.

CLEVELAND ELECTRO METALS CO., W. 38 St. & Nickel Plate R.R., Cleveland 13.

CLEVELAND FLUX CO., 1026-1040 Main Ave., N.W., Cleveland 13.

CLEVELAND GYPSUM CO., 2146 W. 3rd St., Cleveland 13.

CLEVELAND METAL ABRASIVE CO., 887 E. 67 St., Cleveland 8.

CLEVELAND QUARRIES CO., Amherst, O.

CLEVELAND ROCK DRILL DIV., LE ROI CO., 12500 Berea, Cleveland 11.

CLEVELAND STANDARD PATTERN WORKS, 5337 St. Clair Ave., Cleveland 3.

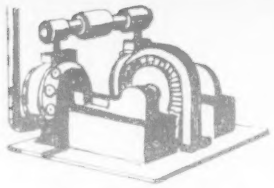
CLEVELAND TAPPING MACHINE CO., 1201 Camden Ave. S.W., Canton 6, O.

CLEVELAND VIBRATOR CO., 2828 Clinton Ave., W., Cleveland 13.

CLIPPER MFG. CO., 2800 Warwick, Kansas City 8, Mo.

E. D. CODDINGTON MFG. CO., 5024 N. 37 St., Milwaukee 2.

COFFING HOIST CO., 800 Walters St., Danville, Ill.



COLEMAN ENGINEERING CO., 2400 Dayton Blvd., Chattanooga 5, Tenn.

COLES CRANES INC., P.O. Box 942, Joliet, Ill.

COLLMER BROTHERS, 420 S. St. Joseph, South Bend 1, Ind.

COLUMBIA SOUTHERN CHEMICAL CORP., subsidiary, Pittsburgh Plate Glass Co., 623 Duquesne Way, Pittsburgh 22.

COMBINED METALS REDUCTION CO., PANACALITE DIV., P.O. Box 150, Salt Lake City 10, Utah.

COMBINED SUPPLY & EQUIPMENT CO., 215 Chandler St., Buffalo 7.

CONCO ENGINEERING WORKS, Mendota, Ill.

CONCRETE MATERIAL & CONSTRUCTION CO., Granby Bldg., Cedar Rapids, Iowa.

CONSTRUCTION MACHINERY CO., Waterloo, Iowa.

CONSTRUCTION MACHINERY DIV., CLARK EQUIPMENT CO., Benton Harbor, Mich.

CONTINENTAL INDUSTRIAL ENGINEERS INC., 176 W. Adams St., Chicago 6.

CONTRACTORS MACHINERY CO. INC., Clinton St., Batavia, N. Y.

CORDO MOLDING PRODUCTS CO., 230 Park Ave., New York.

CORE MAKERS CO., 4435 W. Division St., Chicago 51.

CORN PRODUCTS REFINING CO., 17 Battery Pl., New York 4.

CORTLAND GRINDING WHEEL CORP., Chester, Mass.

CRANE CO., 836 S. Michigan Ave., Chicago 5.

CRANE HOIST ENGRG. CORP., 6515 Salt Lake Ave., Bell, Calif.

CRESCENT BRASS & PIN CO., 5766 Trumbull Ave., Detroit 8.

FRANK L. CROBAUGH CO., 1426 W. 3rd St., Cleveland 13.

CROWN ZELLERBACH CORP., INDUSTRIAL PRODUCTS DIV., North Portland, Oreg.

CRUCIBLE STEEL CO. OF AMERICA, P.O. Box 88, Pittsburgh 30.

CURTIS PNEUMATIC MACHINERY DIV., CURTIS MFG. CO., 1905 Kienlen Ave., St. Louis 20.

D

C. R. DANIELS INC., Box 6908, Baltimore 16.

DAVENPORT MACHINE & FOUNDRY CO., 1623 W. 4 St., Davenport, Iowa.

DAYTON OIL CO., 1201 E. Monument Ave., Dayton 1, O.

DAYTON PNEUMATIC TOOL CO., P.O. Box 747, Dayton 1, O.

DE BARDELEBEN COAL CO., 2201 First Ave., Birmingham 3.

DE BOTHEZAT FANS DIV., AMERICAN MACHINE & METALS CO., E. Moline, Ill.

A. P. deSANNO & SON INC., Phoenixville, Pa.

DE VILBISS CO., 300 Phillips Ave., Toledo 1, O.

DEBEVOISE-ANDERSON CO. INC., 295 Madison Ave., New York 17.

DEISTER CONCENTRATOR CO., 901 Glasgow Ave., Ft. Wayne, Ind.

DELHI FOUNDRY SAND CO., Saylor Park Station, Cincinnati 33.

DELTA OIL PRODUCTS CO., 6263 Cedarburg Rd., Milwaukee 9.

DELTA POWER TOOL DIV., ROCKWELL MFG. CO., 400 N. Lexington Ave., Pittsburgh 8, Pa.

WILLIAM DEMMLER & BROS., Kewanee, Ill.

DEMPSTER BROTHERS INC., 735 Springdale Ave., Knoxville 17, Tenn.

DENVER EQUIPMENT CO., 1400—17th St., Denver 17.

DENVER FIRE CLAY CO., 2301 Blake St., Denver 2.

DESMOND STEPHAN MFG. CO., Urbana, O.

DESPATCH OVEN CO., 621 Eighth St. S.E., Minneapolis 14.

DETROIT ELECTRIC FURNACE DIV., KUHLMAN ELECTRIC CO., Bay City, Mich.

DETROIT HOIST & MACHINE CO., 8201 Morrow St., Detroit 11.

DETROIT SHEET METAL WORKS, 1300 Oakman Blvd., Detroit 6.

DETROIT TESTING MACHINE CO., 9390 Grinnell St., Detroit 13.

DIAMOND CLAMP & FLASK CO., Foot of N. 6 St., Richmond, Ind.

DIAMONITE DIV., U. S. QUARRY TILE CO., 217—4th St. N.E., Canton 2, O.

HARRY W. DIETERT CO., 9330 Roselawn, Detroit 4.

DINGS MAGNETIC SEPARATOR CO., 4740 Electric Ave., Milwaukee 46.

JOSEPH DIXON CRUCIBLE CO., Jersey City 3, N. J.

DoALL CO., 254 N. Laurel Ave., Des Plaines, Ill.

DOCKSON CORP., 3839 Wabash, Detroit 8.

DOLLINGER CORP., 37 Centre Park, Rochester 3, N. Y.

DOUBLE SEAL RING CO., 2065 Montgomery, Ft. Worth, Tex.

DOUGHERTY LUMBER CO., 4300 E. 68th St., Cleveland 5.

DOW CHEMICAL CO., Midland, Mich.

DOW CORNING CORP., Midland, Mich.

DRACCO CORP., 4063 E. 116th St., Cleveland 5.

DRAVO CORP., 1203 Dravo Bldg., Pittsburgh 22.

CHARLES DREIFUS CO., Lincoln-Liberty Bldg., Philadelphia 7.

DREISBACH ENGRG. CORP., 85 Warburton Ave., Yonkers 2, N. Y.

DRYING SYSTEMS INC., 1814 Foster Ave., Chicago 40.

DUREX REFRACTORIES CO., P.O. Box 147, Jackson, O.

DUREZ PLASTICS & CHEMICAL INC., Walck Rd., N. Tonawanda, N. Y.

DUST SUPPRESSION & ENGINEERING CO., Lake Orein, Mich.

E

EASTERN CLAY PRODUCTS DEPT., INTERNATIONAL MINERALS AND CHEMICAL CORP., 20 N. Wacker Dr., Chicago 6.

EASTMAN KODAK CO., 343 State St., Rochester 4, N. Y.

EATON CHEMICAL & DYESTUFF CO., 1490 Franklin, Detroit 7.

EBCO MFG. CO., 401 W. Town St., Columbus 8, O.

ECLIPSE FUEL & ENGINEERING CO., 1125 Buchanan St., Rockford, Ill.

ECONOCAST INC., 1303 Anderson Ave., Chattanooga, Tenn.

ECONOWELD CORP., 140 N. Upland Ave., Dayton, O.

EDER INSTRUMENT CO., 2293 N. Clybourn Ave., Chicago 14.

EDMONT MFG. CO., Coshocton, O.

ELECTRIC CONTROLLER & MFG. CO., 2698 E. 79th St., Cleveland 4.

ELECTRIC FURNACE CO., Salem, O.

ELECTRIC STORAGE BATTERY CO., P.O. Box 8109, Philadelphia 1.

ELECTRIC WHEEL CO., Quincy, Ill.

ELECTRO-ALLOYS DIV., AMERICAN BRAKE SHOE CO., Elyria, O.

ELECTRO METALLURGICAL CO., DIV. OF UNION CARBIDE AND CARBON CORP., 30 E. 42nd St., New York 17.

ELECTRO REFRACTORIES & ABRASIVES CORP., Vars Bldg., Buffalo 2.

ELEMATIC EQUIPMENT CORP., 6731 S. Chicago, Chicago 37.

ELLWOOD SAFETY APPLIANCE CO., 217 Sixth St., Ellwood City, Pa.

ELWELL PARKER ELECTRIC CO., 1836 Euclid Ave., Cleveland 3.

EMERSON ELECTRIC MFG. CO., U. S. ELECTRICAL TOOL DIV., 8100 Florissant Ave., St. Louis 21.

EMPIRE VARNISH CO., 2636 E. 76th St., Cleveland 4.

CHARLES ENGELHARD INC., 900 Passaic Ave., East Newark, N. J.

ERIE STRAYER CO., 834 Geist Rd., Erie, Pa.

ERIEZ MFG. CO., 1945 Grove Dr., Erie 2, Pa.

EUTECTIC WELDING ALLOYS CORP., 172 St. & Northern Blvd., Flushing, N. Y

ROBERT G. EVANS CO., 6315 Brookside Plaza, Kansas City 13, Mo.

EXACT WEIGHT SCALE CO., 956 W. 5 St., Columbus 8, O.

EXOMET INC., Conneaut, O.

EXOTHERMIC ALLOYS & SALES SERVICE, Bridgeville, Pa.

EXOTHERMIC RESEARCH PRODUCTS INC., 405 Peckham, Buffalo.

F

FABREEKA PRODUCTS CO., 222 Summer St., Boston 10.

FACTORY SERVICE CO., 4615 N. 21 St., Milwaukee.

FACTORY SPECIALTY CO., 3418 McDougall, Detroit 7.

FAGEOL HEAT MACHINE CO., 5725 Mt. Elliott, Detroit 11.

FANNER MFG. CO., Brookside Park, Cleveland 1.

A. B. FARQUHAR CO., 142 N. Duke St., York, Pa.

FEDERAL FOUNDRY SUPPLY CO., 4600 E. 71 St., Cleveland 5.

FEDERATED METALS DIV., AMERICAN SMELTING & REFINING CO., 120 Broadway, New York 5.

FIREGAN SALES CO., Board of Trade Bldg., Chicago 4.

FLEX RITE VALE & MFG. CO., 118 S. Cheyenne Ave., Tulsa 3, Okla.

FLEXAUST CO., 100 Park Ave., New York 17.

FLEXIBLE STEEL LACING CO., 4667 Lexington St., Chicago 44.

FLY ASH ARRESTOR CORP., P.O. Box 1883, Birmingham 3.

FORKER CORP., 2044 Random Rd., Cleveland 6.

FOUNDRIES MATERIALS CO., Coldwater, Mich.

FOUNDRIES SUPPLY & SALES CO., 647 W. Virginia St., Milwaukee 4.

FOUNDRY EQUIPMENT CO., 1831 Columbus Rd., Cleveland 13.

FOUNDRY RUBBER INC., 6100 River Rd., Washington 16, D. C.

FOUNDRY SERVICES INC., 260 Madison Ave., New York 16.

FOUNDRY SUPPLIES MFG. CO., 2221 Orchard St., Chicago 14.

FOX GRINDERS INC., Oliver Bldg., Pittsburgh 22.

FOXBORO CO., Foxboro, Mass.

FREEMAN SUPPLY CO., 1152 E. Broadway, Toledo 5, O.

FREMONT FLASK CO., 1000 Wolfe Ave., Fremont, O.

FRONTIER BRONZE CORP., 4870 Packard Blvd., Niagara Falls, N. Y.

FULLER CO., Catasauqua, Pa.

G

GALLAND-HENNING MFG. CO., 2573 S. 31 St., Milwaukee 6.

GAMMA CORP., 112 N. Main St., Mansfield, Mass.

GARDEN CITY FAN CO., 332 S. Michigan Ave., Chicago 4.

GARDNER-DENVER CO., Quincy, Ill.

GARDNER MACHINE, 414 Garden St., Beloit, Wis.

GAS MACHINERY CORP., 16100 Waterloo, Cleveland 10.

GENERAL BLOWER CO., 8600 Ferris, Morton Grove, Ill.

GENERAL ELECTRIC CO., 1 River Rd., Schenectady 5, N. Y.

GENERAL ELECTRIC CO., CHEMICAL DEPT., Pittsfield, Mass.

GENERAL ELECTRIC CO., X-RAY DEPT., 48555 West Electric Ave., Milwaukee 1.

GENERAL FOODS CORP., Kankakee, Ill.

GENERAL FOUNDRY SERVICE, 516-23rd Ave., Oakland, Calif.

GENERAL REFRACTORIES CO., 1520 Locust St., Philadelphia 2.

GENERAL SHOE CORP., 111—7th Ave. N., Nashville, Tenn.

GEROTOR MAY CORP., Maryland Ave., Baltimore 3.

GERWIN INDUSTRIES, 214 Spring St., Michigan City, Ind.

GIFFELS & VALLET INC., 1000 Marquette Bldg., Detroit 26.

GIRDLER CO., THERMEX DIV., 224 E. Broadway, Louisville 2.

GLOBE HOIST CO., East Mermaid Lane & Queens St., Philadelphia 18.

GLOBE IRON CO., Jackson, O.

GLOBE STAMPING CO., 1250 W. 76th St., Cleveland 2.

GLOBE STEEL ABRASIVE CO., Mansfield, O.

GODFREY CONVEYOR CO., 1703-13th St., Elkhart 6, Ind.

GOEHRINGER FOUNDRY SUPPLY CO., 919 W. 5th St., Cincinnati 3.

GOGGLE PARTS CO., 1468 W. 9 St., Cleveland 14.

B. F. GOODRICH RUBBER MFG. CO., Akron 18.

GOODYEAR TIRE & RUBBER CO., Akron 16.

CLAUD S. GORDON CO., 3000 S. Wallace St., Chicago 16.

GREAT LAKES CARBON CORP., Hancock Bldg., Niagara Falls, N. Y.

GREAT LAKES CARBON CORP., PERLITE DIV., 612 S. Flower St., Los Angeles 17.

GREAT LAKES FOUNDRY SAND CO., United Artists Bldg., Detroit 26.

GREAT WESTERN MFG. CO., Box 813, Leavenworth, Kans.

A. P. GREEN FIRE BRICK CO., Mexico, Mo.

GREENE ELECTRIC FURNACE CO., 2702 Sixth Ave. S., Seattle 4.

GREGG PRODUCTS CO., 646 Chestnut St., SW. Grand Rapids 2, Mich.

GRINDLE CORP., 16231 Turner Ave., Markham, Ill.

H

H & H RESEARCH CO., 6303-05 Horatio Ave., Detroit 10.

GEORGE HAISS MFG. CO. INC., Empire State Bldg., New York.

HAMILTON TOOL & MACHINE CO., 48 Dawson St., Newark 5, N. J.

HAMMOND MACHINERY BUILDERS, 1600 Douglas Ave., Kalamazoo 54, Mich.

HANNA ENGINEERING WORKS, 1765 Elston Ave., Chicago 22.

HANSEN MFG. CO., 4031 W. 150 St., Cleveland 11.

HANSON CLUTCH & MACHINERY CO., Tiffin, O.

HAPMAN CONVEYOR CO., 630 Gibson, Kalamazoo 6, Mich.

HARBISON-WALKER REFRACTORIES CO., Farmers Bank Bldg., Pittsburgh 22.

HARDY SAND CO., P.O. Box 476, Evansville, Ind.

HARNISCHFEGER CORP., 4400 W. National Ave., Milwaukee 46.

HARRISON ABRASIVE DIV., METALS DISINTEGRATING CO., Box 290, Elizabeth, N. J.

HARRISON MACHINE CO., 2725 Station Rd., Wesleyville, Pa.

R. G. HASKINS CO., 2651 W. Harrison St., Chicago 12.

HAUCK MFG. Co., 126 Tenth St., Brooklyn 15, N. Y.

HAWS REFRACTORIES CO., 407 Main St., Johnstown, Pa.

HAYLCO CONTROLS CORP., Neenah, Wis.

HECKLETHORN MFG. & SUPPLY CO., Littleton, Colo.

HERCULES POWDER CO., Wilmington 99, Del.

KARL A. HERMAN CO., 412 Fuller St. N.E., Grand Rapids, Mich.

HERMAN PNEUMATIC MACHINE CO., Union Bank Bldg., Pittsburgh 22.

HEVI-DUTY ELECTRIC CO., 4212 Highland Ave., Milwaukee 1.

HEWITT-ROBINS INC., 666 Glenbrook Rd., Stamford, Conn.

HICKMAN, WILLIAMS & CO., Union Commerce Bldg., Cleveland 14.

HILL & GRIFFITH CO., Cincinnati 4.

HINES FLASK CO., 3431 W. 140 St., Cleveland 11.

HOBART BROTHERS, Troy, O.

HOLCROFT & CO., 6545 Epworth Blvd., Detroit 10.

HOMER MFG. CO., Lima, O.

HOOKER ELECTROCHEMICAL CO., Buffalo Ave. & 47th St., Niagara Falls, N. Y.

FRANK G. HOUGH CO., Libertyville, Ill.

E. F. HOUGHTON & Co., 303 W. Lehigh Ave., Philadelphia 33.

JACOB HOUSE & SONS, 52 St. Paul St., Buffalo 8.

HOWE SCALE CO., Rutland, Vt.

C. S. HUMPHREY CO., 240 Second St., Moline, Ill.

C. B. HUNT & SON INC., 1900 E. Pershing, Salem, O.

HUNTER FAN & VENTILATING CO., 373 South Front St., Memphis, Tenn.

O. C. K. HUTCHINSON, 311 Prospect St., Alton, Ill.

HYDRO-BLAST CORP., 2550 N. Western Ave., Chicago 47.

HYDROPRESS INC., 570 Lexington Ave., New York 22.

HYDROWAY SCALES INC., 20624 West 8 Mile Rd., Detroit 19.

HYSTER CO., Portland 8, Oreg.

I

IDEAL CHAPLET WORKS, 1123—16th Ave., Rock Island, Ill.

IDEAL INDUSTRIES INC., Sycamore, Ill.

ILLINOIS CEREAL MILLS, Paris, Ill.

ILLINOIS CLAY PRODUCTS CO., 208 S. LaSalle St., Chicago 4.

ILLINOIS TESTING LABORATORIES INC., 420 N. LaSalle St., Chicago 10.

IMPERIAL BELTING CO., 1750 S. Kilbourn Ave., Chicago 23.

INDIANAPOLIS MACHINERY & SUPPLY CO., 1959 S. Meridian St., Indianapolis 6.

INDUCTION HEATING CORP., 181 Wythe Ave., Brooklyn 11, N. Y.

INDUSTRIAL BROWNHOIST CORP., Bay City, Mich.

INDUSTRIAL CRANE & HOIST CORP., 315 N. Ada St., Chicago 7.

INDUSTRIAL EQUIPMENT CO., 115 N. Ohio St., Minster 2, O.

INDUSTRIAL FOUNDRY SALES, 817 Hall St., Eaton Rapids, Mich.

INDUSTRIAL GLOVES CO., Danville, Ill.

INDUSTRIAL METAL ABRASIVE CO., 1603 Wildwood Ave., Jackson, Mich.

INDUSTRIAL PATTERN WORKS, 2621 W. Belmont Ave., Chicago 18.

INDUSTRIAL SILICA CORP., 315 Stambaugh Bldg., Youngstown 3.

INGERSOLL-RAND CO., 11 Broadway, New York 4.

INGERSOLL STEEL DIV., BORG-WARNER CORP., P.O. Box 273, New Castle, Ind.

INTERNATIONAL ENGINEERING INC., 1145 Bolander Ave., Dayton 1, O.

INTERNATIONAL GRAPHITE & ELECTRODE DIV., SPEER CARBON CO., 629 Lincoln Ave., St. Mary's, Pa.

INTERNATIONAL MOLDING MACHINES CO., LaGrange Pk., Ill.

INTERNATIONAL NICKEL CO., 67 Wall St., New York 5.

INTERNATIONAL SHOE CO., 1509 Washington Blvd., St. Louis 3.

IOWA MFG. CO., 916—16th N.E., Cedar Rapids, Iowa.

IRON LUNG VENTILATOR CO., 5403 Prospect Ave., Cleveland 3.

IRONTON FIRE BRICK CO., Ironton, O.

J

JACKSON IRON & STEEL CO., Jackson, O.

JAEGER MACHINE CO., Columbus 16, O.

JEFFREY MFG. CO., 956 N. Fourth St., Columbus 16, O.

JENNISON-WRIGHT CO., 2473 Broadway, Toledo 1, O.

JENSEN SPECIALTIES INC., 9331 Freeland Ave., Detroit 27.

WILLIAM F. JOBBINS INC., Aurora, Ill.

JOHNS-MANVILLE, 22 E. 40 St., New York 16.

JOHNSON-MARCH CORP., 1724 Chestnut St., Philadelphia 3.

JOHNSTON MFG. CO., 2825 E. Hennepin Ave., Minneapolis 13.

JOY MFG. CO., Henry W. Oliver Bldg., Pittsburgh 22.

K

K. G. EQUIPMENT CO. INC., P. O. Box 538, Allentown, Pa.

KAISER ALUMINUM & CHEMICAL CORP., Kaiser Bldg., Oakland, Calif.

KALAMAZOO MFG. CO., 1827 Reed, Kalamazoo, Mich.

KANE & ROACH INC., Niagara St., Syracuse 4, N. Y.

CHARLES C. KAWIN CO., 431 S. Dearborn St., Chicago 5.

KAYSING IRON WORKS INC., 25th & Montgomery, St. Louis.

KELLER TOOL CO., Grand Haven, Mich.

KEOKUK ELECTRO-METALS CO., 320 Concert St., Keokuk, Iowa.

KEYES-DAVIS CO., Box 155, Battle Creek, Mich.

KEYSTONE ABRASIVE WHEEL CO., Hammond & Gregg Sts., Carnegie, Pa.

KEYSTONE REFRACTORIES CO., 120 Liberty St., New York.

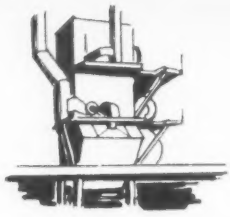
KIMBALL BROS. INC., Council Bluffs, Iowa.

KIRK & BLUM MFG. CO., 3108 Forrer St., Cincinnati 9.

KIRK WHITE CHEMICAL CO., Oconomowoc, Wis.

KNICKERBOCKER CO., 603 Liberty St., Jackson, Mich.

LESTER B. KNIGHT & ASSOCIATES INC., 600 W. Jackson Blvd., Chicago 6.



KOLENE CORP., 3105 E. Grand Blvd., Detroit 2.

KOLMAN MFG. CO., W. 12th St., Sioux Falls, S. Dak.

KORDELL INDUSTRIES, 122 S. Michigan Ave., Chicago 3.

CHAS. A. KRAUSE MILLING CO., 404 E. State St., Milwaukee 1.

KUX MACHINE CO., 6725 North Ridge Ave., Chicago 26.

KWIX-MIX DIVISION, KOEHRING CO., 3026 W. Concordia Ave., Milwaukee 16.

L

LABORATORY EQUIPMENT CORP., Hilltop Rd. & Lakeview, St. Joseph, Mich.

LACLEDE-CHRISTY CO., Arcade Bldg., St. Louis 3.

LAMSON CORP., Lamson St., Syracuse, N. Y.

LANDIS MFG CO., 2035 Hilton Rd., Ferndale, Mich.

LANLY CO., 750 Prospect Ave., Cleveland 16.

LATROBE ELECTRIC STEEL CO., Latrobe, Pa.

LAUHOFF GRAIN CO., Danville, Ill.

LAVA CRUCIBLE CO. OF PITTSBURGH, 309 Wabash Bldg., Pittsburgh 22.

R. LAVIN & SONS INC., 3426 S. Kedzie Ave., Chicago 23.

LEE RUBBER & TIRE CORP., Republic Rubber Div., Youngstown.

LEECO CORP., 450 Guardian Bldg., Detroit 26.

LEEDS & NORTHRUP CO., 444 N. 16th St., Philadelphia 40.

LEHIGH FOUNDRIES INC., 1500 Lehigh Drive, Easton, Pa.

LEHIGH NAVIGATION COAL CO., Fidelity Philadelphia Trust Bldg., Philadelphia 9.

LEHIGH SAFETY SHOE CO., Race & Court Sts., Allentown, Pa.

LE ROI CO., 1706 S. 68th St., Milwaukee 14.

LESCHEN WIRE ROPE DIVISION, H. K. PORTER CO. INC., 5909 Kennerly Ave., St. Louis 12.

LESTER ENGINEERING CO., 2711 Church St., Cleveland 13.

LEWIS WELDING & ENGINEERING CO., Bedford, O.

LIFT TRUCKS INC., 2425 Spring Grove Ave., Cincinnati 14.

LIMA LOCOMOTIVE WORKS, CRANE & SHOVEL DIV., Lima, O.

LINCOLN ENGINEERING CO., 5701 Natural Bridge Blvd., St. Louis 20.

LINDBERG ENGINEERING CO., 2450 W. Hubbard St., Chicago 12.

LINDE AIR PRODUCTS CO., DIV. OF UNION CARBIDE & CARBON CORP., 30 E. 42nd St., New York 17.

LINK-BELT CO., 307 N. Michigan Ave., Chicago 1.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14.

LIQUID CARBONIC CORP., 3100 S. Kedzie Ave., Chicago 23.

LITTLE GIANT PRODUCTS INC., 1530 N. Adams St., Peoria, Ill.

LOFTUS ENGINEERING CORP., 610 Smithfield St., Pittsburgh 22.

LOGAN CO., 200 Cable St., Louisville 6, Ky.

LOGAN ENGINEERING CO., 4901 Lawrence Ave., Chicago 30.

LONN MFG. CO., 131 E. New York St., Indianapolis 4.

LOUDEN MACHINERY CO., 609 Broadway, Fairfield, Iowa.

M

M.F.I. INC., 1357 N. Sedgwick St., Chicago 10.

MACHLETT LABORATORIES INC., Springdale, Conn.

MACKLIN SALES CO., Jackson, Mich.

MacLEOD CO., P. O. Box 452, Sharonville, O.

MACWHYTE CO., 2950—14th Ave., Kenosha, Wis.

MAGEE BROTHERS, 1640 Carroll, Chicago 12.

MAGNAFLUX CORP., 7300 N. Lawrence Ave., Chicago 31.

WALTER MAGUIRE CO., 60 E. 42nd St., New York 17.

R. C. MAHON CO., P. O. Box 4666, Detroit 34.

MAHR MFG. DIV., DIAMOND IRON WORKS, 1804 N. 2nd St., Minneapolis 11.

MAIN BELTING CO., 1217 Carpenter St., Philadelphia 47

MALL TOOL CO., 7740 S. Chicago Ave., Chicago 19.

MANHATTAN RUBBER MFG. DIV., RAYBESTOS-MANHATTAN INC., P. O. Box 419, Passaic, N. J.

MANLEY SAND CO., Rockton, Ill.

MANNING, MAXWELL & MOORE INC., Muskegon, Mich.

MANNING PATTERN CO., 1400 Westfield Ave., Waterloo, Iowa.

MANUFACTURING & MINE SUPPLY CO., Connellsville, Pa.

MAQUOKETA CO., Clinton, Iowa.

MARBLETTE CORP., 27-21-30th St., Long Island City, N. Y.

MARIETTA CONCRETE CORP., Marietta, O.

MARKAL CO., 3052 W. Carroll Ave., Chicago 12.

MARQUETTE MFG. CO., 307 E. Hennepin Ave., Minneapolis 13.

L. H. MARSHALL CO., 270 W. Lane St., Columbus 1, O.

MARTIN ENGINEERING CO., 704 Rose St., Kewanee, Ill.

MASONITE CORP., 111 W. Washington, Chicago 2.

MASTER BUILDERS, 7016 Euclid Ave., Cleveland 3.

MASTER PATTERN CO., 1315 Main Ave., Cleveland.

MASTER PNEUMATIC TOOL CO., Krick Rd., P. O. Box 269, Bedford, O.

MATHEWS CONVEYER CO., Ellwood City, Pa.

MATHIESON CHEMICAL CORP., Mathieson Bldg., Baltimore 3.

MAX MFG. CO., 138 Stockton Ave., San Jose 26, Calif.

MAXON PREMIX BURNER CO., Muncie, Ind.

MAY-FRAN ENGINEERING INC., 1710 Clarkstone Rd., Cleveland 12.

McCAFFEY - RUDDOCK TAGLINE CORP., 2121 E. 25 St., Los Angeles 11.

B. F. McDONALD CO., 5721 W. 96 St., Los Angeles 45.

McDOUGALL-BUTLER CO. INC., 2929 Main St., Buffalo 14.

McKAY CO., 1005 Liberty Ave., Pittsburgh 22.

MECHANICAL INDUSTRIES INC., 541 Wood St., Pittsburgh 22.

MEEHANITE METALS CORP., 715 North Ave., New Rochelle, N. Y.

METAL BLAST INC., 872 E. 67th St., Cleveland 3.

METAL CARBIDES CORP., 103 E. Indianola Ave., Youngstown 5.

METAL & THERMIT CORP., 100 E. 42nd St., New York 17.

METALLIZING CO. OF AMERICA, 3520 W. Carroll Ave., Chicago 24.

METALLIZING ENGINEERING CO., 38-14-30th St., Long Island City 1, N. Y.

METALLOY CORP., 2560 Rand Tower, Minneapolis 2.

METRO-NITE CO., 333 W. Silver Spring Rd., Milwaukee 9.

METZGAR CO., 424 Douglas, N.W., Grand Rapids 4, Mich.

MEXICO REFRACTORIES CO., Mexico, Mo.

MERCURY MFG. CO., 4044 S. Halsted St., Chicago 19.

MICHIGAN ABRASIVE CO., 11900 E. 8 Mile Rd., Detroit 5.

MICHIGAN CRANE & CONVEYOR CO., 115 McKinstry, Detroit 16.

MICHIGAN OVEN CO., Architects Bldg., 419 Brainard, Detroit 1.

MID-WEST ABRASIVE CO., Owosso, Mich.

MILLER FLUID POWER CO., 2040 N. Hawthorne, Melrose Park, Ill.

CHAS. H. MILLES FOUNDRY CO., 2201 W. 35th St., Chicago 9.

MILWAUKEE CHAPLET & MFG. CO., 1023 S. 40 St., Milwaukee 4.

MILWAUKEE FOUNDRY EQUIPMENT DIV., SPO INC., 3238 W. Pierce St., Milwaukee 4.

MILWAUKEE LEATHER BELTING CO., 1114 N. Water St., Milwaukee 2.

MINCO PRODUCTS CORP., P. O. Box 367, Saginaw, Mich.

MINE SAFETY APPLIANCES CO., Braddock & Thomas Sts., Pittsburgh 8.

MINER-HILLARD MILLING CO., 826 Second National Bank Bldg., Wilkes-Barre, Pa.

MINERALS PROCESSING CORP., 520 Van Rensselaer St., Syracuse 1, N. Y.

MINNEAPOLIS MOLINE CO., Minneapolis.

MINNESOTA MINING & MFG. CO., 900 Farquier Ave., St. Paul 6, Minn.

MIXING EQUIPMENT CO., 135 Mt. Read Blvd., Rochester, N. Y.

MOBILE ROSIN OIL CO., P. O. Box 1162, Mobile, Ala.

MODERN ENGINEERING CO., 3400 Pine Blvd., St. Louis 3.

MODERN EQUIPMENT CO., Port Washington, Wis.

MODINE MFG. CO., Dekoven Ave., Racine, Wis.

MOLYBDENUM CORP. OF AMERICA, Grant Bldg., Pittsburgh 19.

MONK TOOL CO., Union St., Geneva, Ill.

MONROE SALES CORP., 333 Midland Ave., Detroit 3.

MONSANTO CHEMICAL CO., Springfield, Mass.

MOORE CO., 422 Professional Bldg., Charleston 28, W. Va.

MORTON SALT CO., 120 S. LaSalle St., Chicago 3.

MOTO-TRUC CO., 1953 E. 59th St., Cleveland 3.

MOULDERS' FRIEND, Dallas City, Ill.

MULLER MACHINERY CO., Metuchen, N. J.

MULLITE REFRACTORIES CO., 95 Canal St., Shelton 1, Conn.

MULTI FINISH MFG. CO., 2116 Monroe, Detroit 7.

JAS. A. MURPHY & CO. INC., P. O. Box 614, Hamilton, O.

D. J. MURRAY MFG. CO., 1002-24 Third St., Wausau, Wis.

N

NATIONAL ADHESIVES DIV., NATIONAL STARCH PRODUCTS INC., 270 Madison Ave., New York 16.

NATIONAL CARBON CO. INC., 30 E. 42 St., New York 17.

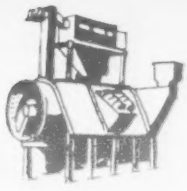
NATIONAL CRUCIBLE CO., Mermaid Lane & Queens St., Philadelphia 18.

NATIONAL CYLINDER GAS CORP., 840 N. Michigan Ave., Chicago 11.

NATIONAL ENGINEERING CO., 549 W. Washington, Chicago 6.

NATIONAL FOUNDRY SAND, 2970 W. Grand Blvd., Detroit 2.

NATIONAL GYPSUM CO., 325 Delaware Ave., Buffalo.



NATIONAL METAL ABRASIVE CO., Norton Rd., Cleveland 11.

NATIONAL PIGMENT CO. INC., Orthodox St. at Delaware River, Philadelphia 37.

NATIONAL PULVERIZING CO., Millville, N. J.

NATIONAL SPECTOGRAPHIC LABORATORIES INC., 6300 Euclid Ave., Cleveland 3.

NATIONAL STONE CO., Ellwood City, Pa.

NATIONAL SUPER SERVICE CO., 12th and Woodruff, Toledo, O.

NEFF & FRY CO., Camden, O.

NEW ENGLAND COKE CO., 250 Stuart St., Boston 16.

NEW JERSEY MATCHPLATE CO., 131 Palmer Ave., Plainfield, N. J.

NEW JERSEY METER CO., Waynwood Park, Plainfield, N. J.

NEW YORK & NEW JERSEY LUBRICANT CO., 292 Madison Ave., New York 17.

NEW YORK BELTING & PACKING CO., 1 Market St., Passaic, N. J.

NEWAYGO ENGINEERING CO., Newago, Mich.

NEWCOMB-DETROIT CO. INC., 5741 Russell, Detroit 11.

NIAGARA FALLS SMELTING & REFINING DIV., CONTINENTAL UNITED INDUSTRIES CO., 2204 Elmwood Ave., Buffalo 17.

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5.

WM. H. NICHOLLS CO. INC., 39-27—126th St., Richmond Hill 18, N. Y.

NOCK FIRE BRICK CO., 1243 E. 55th St., Cleveland 3.

NORTH AMERICAN MFG. CO., 4455 E. 71st St., Cleveland 5.

NORTH AMERICAN PHILIPS CO., Mt. Vernon, N. Y.

NORTH STATE PYROPHYLLITE CO., P. O. Box 164, Pomona, N. C.

NORTHERN BLOWER CO., W. 65 St. & Denison Ave., Cleveland 2.

NORTHERN ENGINEERING WORKS, 2615 Atwater St., Detroit 7.

NORTHWESTERN METAL CO., 900 "T" St., Lincoln, Nebr.

NORTON CO., Worcester 6, Mass.

NORWALK VALVE CO., 33 Railroad Ave., South Norwalk, Conn.

NUGENT SAND CO. INC., Muskegon, Mich.

NU-MATIC GRINDERS INC., 8224 Carnegie Ave., Cleveland 3.

O

OAK HILL FIRE BRICK CO., Oak Hill, O.

OAKITE PRODUCTS INC., 19 Rector St., New York 6.

OBERLAENDER SAND CO., 2433—27th St., Moline, Ill.

S. OBERMAYER CO., 2563 W. 18th St., Chicago 8.

OHIO BLOW PIPE CO., 1727 Doan Ave., Cleveland 12.

OHIO CONVEYOR CO., 1310 N. Main St., Findlay, O.

OHIO CRANKSHAFT CO., TOCCO DIV., 4620 E. 71st St., Cleveland 5.

OHIO ELECTRIC MFG. CO., 5400 Dunham Rd., Maple Hts., O.

OHIO FERRO-ALLOYS CORP., Citizens Bldg., Canton 2, O.

OHIO FIRE BRICK CO., Oak Hill, O.

OLDS ALLOYS CO., 4481 Mason St., South Gate, Calif.

OLIVER MACHINERY CO., Grand Rapids 2, Mich.

OLMSTED CLAY CO., Cairo, Ill.

SAMUEL OLSON MFG. CO. INC., 2418 Bloomingdale, Chicago 47.

KURT ORBAN CO., 21 West St., New York 6.

OREFRACTION INC., 7525 Thomas St., Pittsburgh 8.

OSBORN MFG. CO., 5401 Hamilton Ave., Cleveland 14.

OSGOOD GENERAL, Marion, O.

OTTAWA SILICA CO., Ottawa, Ill.

P

PACIFIC GRAPHITE CO. INC., 40th & Linden Sts., Oakland 8, Calif.

PAKO CORP., 1006 Lyndale Ave. N., Minneapolis 11.

PALMER-BEE CO., Westminster & G.T.R.R., Detroit 12.

PANGBORN CORP., Hagerstown, Md.

PARK CHEMICAL CO., 8074 North Military, Detroit 4.

PARSONS ENGRG. CORP., 4590 Beidler Rd., Willoughby, O.

PATTERSON FOUNDRY & MACHINE CO., East Liverpool, O.

PATTERSON-KELLEY CO., East Stroudsburg, Pa.

PEERLESS ELECTRIC CO., FAN AND BLOWER DIV., Warren, O.

PEERLESS MINERAL PRODUCTS CO., Conneaut, O.

PEKAY MACHINE & ENGINEERING CO., 865 N. Sangamon St., Chicago 22.

PELRON CORP., 7740 W. 47th St., Lyons, Ill.
PENINSULAR GRINDING WHEEL CO., 720

GEORGE M. PENDERGAST & CO., 226 S. First St., Milwaukee.

PENN IRON WORKS INC., P. O. Box 1417, Reading, Pa.

PENINSULAR GRINDING WHEEL CO., 720 Meldrum, Detroit 7.

PENNSYLVANIA FOUNDRY SUPPLY & SAND CO., Lewis & Ashland Sts., Philadelphia 24.

PENNSYLVANIA GLASS SAND CORP., 140 Stanwix St., Gateway Center, Pittsburgh 22.

PENNSYLVANIA PERLITE CORP., P. O. Box 694, Allentown, Pa.

PENNSYLVANIA PUMP & COMPRESSOR CO., Easton, Pa.

PENOLA OIL CO., Penobscot Bldg., Detroit 26.

PERALEX OF NEW JERSEY INC., 64 Barclay St., Paterson 3, N. J.

PERLITE MFG. CO., P. O. Box 478, Carnegie, Pa.

PETERSON CORE OIL & MFG. CO., P. O. Box 99, Melrose Park, Ill.

PETERSON WELDING LABORATORIES, 1423 Virginia, Kansas City 6, Mo.

PHILADELPHIA COKE CO., 4501 Richmond, Philadelphia 37.

PHILLIPS MINE & MILL SUPPLY CO., 2227 Jane St., Pittsburgh.

PHILLIPS PETROLEUM CO., Adams Bldg., Bartlesville, Okla.

PICKANDS, MATHER & CO., Union Commerce Bldg., Cleveland 14.

PICKER X-RAY CORP., 25 S. Broadway, White Plains, N. Y.

PIONEER MFG. CO., West Allis, Wis.

PIONEER RUBBER CO., Willard, O.

PITNER & HESS, 715 Fifth St., Bedford, Ind.

PITTSBURGH COKE & CHEMICAL CO., Grant Bldg., Pittsburgh.

PITTSBURGH CRUSHED STEEL CO., 4839 Harrison St., Pittsburgh 1.

PITTSBURGH LECTRODRYER CO., P. O. Box 1257, Pittsburgh 30.

PITTSBURGH LECTROMELT FURNACE CORP., P. O. Box 1257, Pittsburgh 30.

PITTSBURGH METALS PURIFYING CO., 1352 Marvista St., Pittsburgh 12.

PLASTIC CORP. OF CHICAGO, 8437 Ogden Ave., Lyons, Ill.

POLISHING & GRINDING MACHINERY, 1815 Madison Ave., Indianapolis 2.

PORCELAIN PRODUCTS INC., 4222 W. Sandusky St., Findlay, O.

PORTER CABLE MACHINE CO., 1714 N. Salina, Syracuse 8, N. Y.

PORTER WARNER INDUSTRIES INC., 335 Volunteer Life Bldg., Chattanooga 2, Tenn.

POSEY IRON WORKS INC., BRICK MACHINERY DIV., Lancaster, Pa.

POWELL PRESSED STEEL CO., Hubbard, O.

PRAB CONVEYORS INC., 19875 Machine Ave., Detroit 36.

PRAT-DANIEL CORP., S. Norwalk, Conn.

PRECAST SLAB & TILE CO. INC., 1367 S. Kings Highway Blvd., St. Louis 10.

PRENCO PRODUCTS INC., 22022 Woodward Ave., Detroit 20.

PRESSED STEEL CO., 705 N. Pennsylvania Ave., Wilkes-Barre, Pa.

HAROLD PRIDMORE, P. O. Box 137, Palo Alto, Calif.

PRIME MOVER CO., Third and Oak Sts., Muscatine, Iowa.

J. F. PRITCHARD & CO., 210 W. 10 St., Kansas City 5, Mo.

PRODUCERS CORE SAND CORP., Warren Bldg., Michigan City, Ind.

PRODUCTIVE EQUIPMENT CO., 2926 W. Lake St., Chicago 12.

PRODUCTS ENGINEERING CO., Cape Girardeau, Mo.

PYRO REFRACTORIES CO., Oak Hill, O.

PYROMETER INSTRUMENT CO., Bergenfield, N. J.

Q

QUINCY FOUNDRY INC., Quincy, O.

R

R & J FOUNDRY, 610 S. 94 St., West Allis 14, Wis.

RADIUM CHEMICAL CO., 161 E. 42nd St., New York 17.

RAMTITE CO., 2563 W. 18 St., Chicago.

RANSBURG ELECTRO - COATING CORP., 1234 Barth, Indianapolis, Ind.

N. RANSOHOFF INC., N. 5th St. at Ford Blvd., Hamilton, O.

READING CRANE & HOIST CORP., Reading, Pa.

REDA PUMP CO., Bartlesville, Okla.

REDFORD IRON & EQUIPMENT CO., 20733 Glendale Ave., Detroit 23.

HERBERT A. REECE, 960 Union Commerce Bldg., Cleveland 14.

REFRACT-ALL CO., 5025½ N. Lewis, Tulsa, Okla.

W. G. REICHERT ENGINEERING CO., 1060 Broad St., Newark, N. J.

REICHHOLD CHEMICALS INC., 525 N. Broadway, White Plains, N. Y.

REID-AVERY CO., Dundalk, Baltimore 22.

RICHARD C. REMMEY & SON CO., Hedley St. & Delaware River, Philadelphia 37.

REPUBLIC COAL & COKE CO., 8 S. Michigan Ave., Chicago 3.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1.

RESEARCH CORP., Bound Brook, N. J.

RESERVE MACHINE & TOOL CO., 3714 Ridge Rd., Cleveland.

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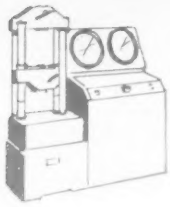

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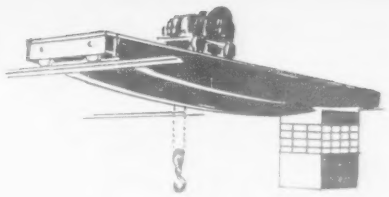

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Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Whitehead Bros., 324 West 23rd St., New York 11, N. Y.

BERYLLIUM COPPER ALLOYS
Beryllium Corp., Reading, Pa.

BINDERS (Shell Mold)
Bakelite Corp., 300 Madison Ave., New York 17, N. Y.
The Borden Co., Thor Division, 350 Madison Ave., New York 17, N. Y.
Durez Plastics & Chemicals Co., North Tonawanda, N. Y.
Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.
Reichhold Chemical Co., 525 North Broadway, White Plains, N. Y.

BINS (Storage)
American Bridge Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.

Marietta Concrete Corp., Marietta, Ohio.
Neff & Fry Co., Camden, Ohio.

BLACKING (Mold Core)
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Stevens, Frederic B., Inc., Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

BLASTING EQUIPMENT
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
The Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Illinois.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

BLAST METERS
Foxboro Company, Foxboro, Mass.

BLOWERS
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Campbell-Hausfeld Co., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
General Blower Co., Morton Grove, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Roots-Connersville Blower Div., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Stroman Furnace & Engineering Co., Division of Petersen Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

BOND CLAY
Baroid Sales Division, 637 Railway Exchange Bldg., 80 East Jackson Blvd., Chicago 4, Ill.
Eastern Clay Products, Dept., International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Ironton Fire Brick Co., Ironton, O.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

BOOKS (Technical)
Penton Publishing Co., 1213 West 3rd St., Cleveland 13, O.

BOROSIL
Ohio Ferro-Alloys Corp., Canton 2, Ohio.

BOTTOM PLATES and BOARDS
Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 6, Mo.
Christiansen Corp., 210 South Marion, Oak Park 1, Ill.
Foundries Materials Co., Coldwater, Mich.
Pressed Steel Div., Republic Steel Corp., 6100 Truscon Ave., Cleveland, Ohio.
R & J Foundry, 610 S. 94th St., West Allis 14, Wis.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

BOWLS and SHANKS
Industrial Equipment Co., Minster, Ohio.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

BOXES (Pallet Shipping)
Wood Fabricating Co., 3762 Wyoming, Dearborn, Mich.

BOXES (Stacking)
Palmer Shile Co., 1600 Fullerton Ave., Detroit 27, Mich.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Union Metal Mfg. Co., Canton, Ohio.

BOXES (Tote)
Brummeler Steel Products Co., Grand Rapids, Mich.
Palmer Shile Co., 1600 Fullerton Ave., Detroit 27, Mich.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Union Metal Mfg. Co., Canton, Ohio

BRAKES (Magnetic)
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

BRASS AND BRONZE INGOT (See INGOTS, Nonferrous)

BRICK (Refractory)
Carborundum Co., Perth Amboy, N. J.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.
Titanium Alloy Mfg. Div., National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.

BRIQUETS (Alloy)
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

BRIQUETS (Ferro Alloy)
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

BRIQUETS (Graphite)
United States Graphite Co., Saginaw, Mich.

BRIQUETS (Manganese)
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, Ohio.

BRIQUETS (Silicon Carbide)
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N.Y.

BRIQUETTING MACHINERY (Metal)
Milwaukee Foundry Equipment Div., Spo Inc., 3328 Pierce St., Milwaukee 4, Wis.

BRUSHES
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

BRUSHES (Wire)
Hewitt Rubber Division, Hewitt-Robins Inc., 240 Kensington Ave., Buffalo 5, N. Y.

BUCKETS (Elevating, Clam Shell, Drag Line, Grab, Loader, Dumping)
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Erie Strayer Co., Erie, Pa.
Great Western Mfg. Co., Leavenworth, Kansas.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Pekay Machine & Engineering Co., 865 N. Sangamon St., Chicago 22, Ill.
Penn Iron Works, Inc., Reading, Pa.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.
Youngstown Steel Door Co., Euclid Superior Arcade, Cleveland, Ohio.

BUCKETS (Hook-on)
Erie Strayer Co., Erie, Pa.

BUILDING and ENGINEERING SERVICE
American Bridge Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.

BURNERS (Acetylene, Oil, Gas, Powdered Coal, Stoker)
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

BUSHINGS (Flask-Pin)
The Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 3, Mo.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Smillie & Co., C. M., 1124 Woodward Hgts. Blvd., Ferndale 20, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

CALCIUM BORIDE
Molybdenum Corporation of America, Pittsburgh 19, Pa.

CALCIUM MOLYBDATE
Molybdenum Corporation of America, Pittsburgh 19, Pa.

CARBON BOOSTER
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., Saginaw, Mich.

CARS (Core Oven)
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

CARS (Mold Drying)
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

CASTING GRIPS (Air Powdered)
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

CASTING MACHINES (Centrifugal)
Centrifugal Casting Mach. Co., Tulsa, Okla.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

CASTING MACHINES (Permanent Mold)
Centrifugal Casting Machine Co., Tulsa, Okla.

CASTING SEALER
Tincher Products Co., Sycamore, Ill.
Tousey Varnish Co., 520 West 25th St., Chicago 16, Ill.

CASTINGS
City Pattern Foundry & Machine Co., 1165 Harper, Detroit 11, Mich.
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
Wellman Bronze & Aluminum Co., 12800 Shaker Blvd., Cleveland 20, Ohio.

CEMENT (Metallic)
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City 4, N. J.
Frederic B. Stevens, Inc., Detroit 16, Mich.

CEMENT (Refractory)
Bay State Abrasive Products Co., Westboro, Mass.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N.Y.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Norton Co., Worcester 6, Mass.

CHAIN (Hoist, Conveyor, Drive, Sling, etc.)
American Chain Div., American Chain & Cable Co. Inc., York, Pa.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Great Western Mfg. Co., Leavenworth, Kansas.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
S. G. Taylor Chain Co., Hammond, Ind.

CHAIN (Welded and Weldless)
American Chain Div., American Chain & Cable Co. Inc., York, Pa.
Chisholm-Moore Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
S. G. Taylor Chain Co., Hammond, Indiana.

CHAINS (Sling)
S. G. Taylor Chain Co., Hammond, Ind.

CHAPLETS
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Cleveland Chaplet & Mfg. Co., 26470 Lakeland Blvd., Cleveland 23, O.
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Fanner Mfg. Co., Brookside Park, Cleveland 2, Ohio.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee 4, Wis.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.

CHEMICALS
Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.

CHEMISTS
Chas. C. Kawin Co., 431 S. Dearborn St., Chicago 5, Ill.

CHILLS
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
Fanner Mfg. Co., Brookside Park, Cleveland 2, Ohio.
Milwaukee Chaplet & Mfg. Co., 1023 So. 40th St., Milwaukee 4, Wis.
Standard Horse Nail Corp., New Brighton, Pa.

CHILL COATINGS
Acheson Colloids Co., Port Huron, Mich.

CHILL NAILS
Standard Horse Nail Corp., New Brighton, Pa.

CHIPPERS—See PNEUMATIC TOOLS

CHISELS (Chipping)
Cleco Division of Reed Roller Bit Co., Houston, Texas.
Independent Pneumatic Tool Co., Aurora, Illinois.

CHROMIUM (Briquets)
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

CLAMPS (Flask)
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 3, Mo.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Pressed Steel Div., Republic Steel Corp., 6100 Truscon Ave., Cleveland, Ohio.
Shanafelt Mfg. Co., Canton, Ohio.
Sterling Wheelbarrow Co., 1700 W. Walker St., Milwaukee 14, Wis.

CLAY (Bonding)
Baroid Sales Division, 637 Railway Exchange Bldg., 80 East Jackson Blvd., Chicago 4, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin Ave., Milwaukee 3, Wis.
Cedar Heights Clay Co., Oak Hill, Ohio.
Eastern Clay Products Dept. International Minerals & Chemical Corp., 20 N. Wacker Dr., Chicago 6, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Hooker Electrochemical Co., Buffalo Avenue & 47th St., Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CLAY (Refractory)
Carpenter Brothers, Inc., 606 West Wisconsin Ave., Milwaukee 3, Wis.
Cedar Heights Clay Co., Oak Hill, Ohio.
Eastern Clay Products, Dept. International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co. Joliet, Ill.

CLEANING COMPOUNDS
Pelron Corporation, 7740 West 47th St., Lyons, Ill.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

CLEANING EQUIPMENT (Castings)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

CLUTCHES (Magnetic)
Dings Magnetic Separator Co., 4710 Electric Ave., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

COKE (Foundry)
Alabama By Products Corp., Post Office Box 354, Birmingham, Ala.
DeBardeleben Coal Corp., 2201 First Ave., N., Birmingham 3, Ala.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Philadelphia Coke Co., 4501 Richmond St., Philadelphia 37, Pa.
Pickands, Mather & Co., Cleveland 14, O.
Pittsburgh Coke & Chemical Co., Grant Building, Pittsburgh 19, Pa.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago 3, Ill.
Semet Solvay Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

COKE (Petroleum)
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.
Republic Coal and Coke Co., 8 S. Michigan Ave., Chicago 3, Ill.

CONVERTER BLOWERS
Roots-Connersville Blower Div., Connersville, Ind.

CONVERTERS (Bessemer)
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVEYOR DESIGN
Giffels & Valet, Inc., Marquette Bldg., Detroit, Mich.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.

CONVEYORS (Belt)
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
B. F. Goodrich Co., Akron, Ohio.
Great Western Mfg. Co., Leavenworth, Kansas.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Robins Conveyors Div., Hewitt Robins Inc., 270 Passaic Ave., Passaic, N. J.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Chain)
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Gravity Roller)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Live Roller)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Magnetic)
Homer Mfg. Co., Lima, Ohio.
Stearns Magnetic Inc., 635 South 28th St., Milwaukee 46, Wis.

CONVEYORS (Metal Belt)
May-Fran Engineering, Inc., 1710 Clarkstone Road, Cleveland 12, Ohio.

CONVEYORS (Mold)—See MOLD CONVEYORS

CONVEYORS (Monorail)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 E. 283rd St., Wickliffe, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

CONVEYORS (Overhead)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Inc., Reading, Pa.

CONVEYORS (Pneumatic)
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Crane Co., 836 South Michigan, Chicago 5, Ill.
Fuller Company, Catasauqua, Pa.

CONVEYORS (Portable)
American Conveyor Co., 1115 West Adams St., Chicago 7, Ill.

CONVEYORS (Portable Gas-Electric)
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

CONVEYORS (Roller)
Westover Engineers, 3110 W. Fond Du Lac Ave., Milwaukee 10, Wis.

CONVEYORS (Rubber)
B. F. Goodrich Co., Akron, Ohio.
Link-Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Vibrating)
Ajax Flexible Coupling Co., Westfield, N. Y.
Carrier Conveyor Corp., Frankfort Ave. at Clifton, Louisville 6, Ky.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Kaysing Iron Works Inc., 25th & Montgomery, St. Louis, Mo.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Simplicity Engineering Co., Durand, Mich.

COPPER
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

COPPER SHOT
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Niagara Falls Smelting & Refining Div., Continental-Copper & Steel Industries, Inc., 2200-2214 Elmwood Ave., Buffalo 23, N. Y.

CORE BINDERS
Acme Resin Corp., Forest Park, Ill.
American Gum Products Co., 500 Fifth Ave., New York 18, N. Y.
Archer-Daniels-Midland Co., Foundry Products Div., 2191 W. 110th St., Cleveland 2, O.
Bakelite Corp., 300 Madison Ave., New York 17, N. Y.
Barrett Division, Allied Chemical & Dye Corp., 40 Rector Street, New York 6, N. Y.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
The Borden Co., Thor Division, 350 Madison Ave., New York 17, N. Y.
Cities Service Oil Co., 20 N. Wacker Dr., Chicago 6, Ill.
Corn Products Refining Co., 17 Battery Pl., New York 4, N. Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Durez Plastics & Chemicals Co., North Tonawanda, N. Y.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
General Electric Co., Pittsfield, Mass.
Hercules Powder Co., Wilmington 99, Del.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Monsanto Chemical Co., Plastics Division, Springfield 2, Mass.
Pelron Corporation, 7740 West 47th St., Lyons, Ill.
Penola Oil Co., 14300 McNichols Rd., West, Detroit 35, Mich.
Reichhold Chemical Co., 525 North Broadway, White Plains, N. Y.
Robeson Process Co., 500 Fifth Ave., New York 18, N. Y.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Swan-Finch Oil Corp., 205 East 42nd St., New York 17, N. Y.
United Oil Co., Erie, Pa.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE BLOWER BUSHINGS
Eastern Clay Products, Dept. International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.

CORE BLOWING MACHINES
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
International Molding Machine Co., LaGrange Park, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

COREBOXES
Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.

CORE COLORING
Eaton Chemical & Dyestuff Co., 1490 Franklin, Detroit, Mich.

CORE COMPOUNDS
Archer-Daniels-Midland Co., Foundry Products Div., 2191 W. 110th St., Cleveland 2, O.
Bakelite Corp., 300 Madison Ave., New York 17, N. Y.
Barrett Division, Allied Chemical & Dye Corp., 40 Rector Street, New York 6, N. Y.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
The Borden Co., Thor Division, 350 Madison Ave., New York 17, N. Y.
Cities Service Oil Co., 20 N. Wacker Dr., Chicago 6, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Durez Plastics & Chemicals Co., North Tonawanda, N. Y.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Goehringer Foundry Supply Co., 919 West Fifth St., Cincinnati 3, Ohio.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Pelron Corporation, 7740 West 47th St., Lyons, Ill.
Penola Oil Co., 14300 McNichols Rd., West, Detroit 35, Mich.
Frederic B. Stevens, Inc. Detroit 16, Mich.
Swan-Finch Oil Corp., 205 East 42nd St., New York 17, N. Y.
United Oil Mfg. Co., Erie, Pa.

Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE DRAWING MACHINES
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.

CORE DRIERS
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

CORE GRINDERS (Power Operated)
Jeffrey Mfg. Co., Columbus 16, O.
Milwaukee Foundry Equipment Div., Spo Inc., 3328 Pierce St., Milwaukee 4, Wis.
Sutter Products Co., Dearborn, Mich.

CORE KNOCKOUT MACHINES
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Beardsley & Piper Div. Pettibone-Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

COREMAKING MACHINES
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Champion Div. Pettibone-Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Federal Foundry Supply Co., 4600 E.71st St., Cleveland 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3328 Pierce St., Milwaukee 4, Wis.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
Sutter Products Co., Dearborn, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CORE OILS
Archer-Daniels-Midland Co., Foundry Products Div., 2191 W. 110th St., Cleveland 2, O.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Cities Service Oil Co., 20 N. Wacker Dr., Chicago 6, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Pelron Corporation, 7740 West 47th St., Lyons, Ill.
Penola Oil Co., 14300 McNichols Rd., West, Detroit 35, Mich.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Swan-Finch Oil Corp., 205 East 42nd St., New York 17, N. Y.
United Oil Mfg. Co., Erie, Pa.

CORE OVEN HEATERS (Electric)
Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

CORE OVEN HEATING UNITS
Burdett Mfg. Co., 3433 W. Madison, Chicago 7, Ill.

CORE OVENS
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Burdett Mfg. Co., 3433 W. Madison, Chicago 7, Ill.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Drying Systems, Inc., 1800 W. Foster Ave., Chicago 40, Ill.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Girdler Corp., Thermex Division, 224 E. Broadway, Louisville 2, Ky.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Industrial Ovens Inc., 13825 Triskett Rd., Cleveland 11, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Michigan Oven Co., 419 Brainard St., Detroit 1, Mich.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
J. O. Ross Engineering Corp., 444 Madison Ave., New York 17, N. Y.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Stroman Furnace & Engineering, Div. of Petersen Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

CORE PASTE
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Corn Products Refining Co., 17 Battery Pl., New York 4, N. Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products, Dept. International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundries Materials Co., Coldwater, Mich.
Goehringer Foundry Supply Co., 919 West Fifth St., Cincinnati 3, Ohio.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Superior Flake Graphite Co., 33 So. Clark St., Chicago 3, Ill.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE PLATES (Magnesium)
Christiansen Corp., 210 South Marion, Oak Park 1, Ill.

CORE PLATES (Steel, Asbestos)
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 6, Mo.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Pressed Steel Div. Republic Steel Corp., 6100 Truscon Ave., Cleveland, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

CORE ROD STRAIGHTENING and CUTTING MACHINERY
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE SAND
American Silica Sand Co., Central Life Bldg., Ottawa, Ill.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Nugent Sand Co., Muskegon, Mich.
Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.
Pennsylvania Glass Sand Corp., 140 Stanwix St., Pittsburgh 22, Pa.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Titanium Alloy Mfg. Div., National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

CORE SAND MIXERS
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio.
Mueller Machinery Co., Metuchen 1, N. J.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
The Patterson-Kelley Co. Inc., East Stroudsburg, Pa.
Posey Iron Works Inc., Lancaster, Pa.
Royer Foundry & Machine Co., Kingston, Pa.
Standard Sand & Machine Co., Blystone Div., 549 W. Washington Blvd., Chicago 6, Ill.

CORE SPRAYERS
Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.

CORE STRIPPERS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE TRUCKS
Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Prime Mover Co., Muscatine, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

CORE VENTS
Andrea Mfg. Co., 180 North Wacker Drive, Chicago 6, Ill.
Demmler, Wm., & Bros., Kewanee, Ill.
Smillie, C. M. & Co., 1124 Woodward Heights Blvd., Ferndale 20, Mich.

CORE WASH
Acheson Colloids Co., Port Huron, Mich.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Carborundum Co., Perth Amboy, N. J.
Cities Service Oil Co., 20 N. Wacker Dr., Chicago 6, Ill.
Corn Products Refining Co., 17 Battery Pl., New York City 4.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundries Materials Co., Coldwater, Mich.
Foundry Services, Inc., 260 Madison Avenue, New York 16, N. Y.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Stevens, Frederic B., Inc., Detroit 26, Mich.
Superior Flake Graphite Co., 33 So. Clark St., Chicago 3, Ill.
Titanium Alloy Mfg. Div. National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.
United Oil Co., Erie, Pa.
United States Graphite Co., Saginaw, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE WIRES
Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.

CORES (Annealing)
Pressed Steel Co., Wilkes-Barre, Pa.

CORES (Ceramic)
American Lava Corp., Chattanooga 5, Tenn.

CORES (Strainer) see STRAINER CORES

COUPLINGS (Air Line)
Cleco Division of Reed Roller Bit Co., Houston, Tex.
C. B. Hunt & Sons Inc., Salem, Ohio.
A. Schrader's Son, 470 Vanderbilt Ave., Brooklyn 17, N. Y.

CRANE LUBRICATING SYSTEMS
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Bucket)
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Electric Tramrail)
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

CRANES (Electric Traveling)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Erie Strayer Co., Erie, Pa.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.
Industrial Crane & Hoist Corp., 315 North Ada St., Chicago 7, Ill.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.
Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa.

CRANES (Gantry)
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Modern Equipment Co., Port Washington, Wis.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, Ohio.

CRANES (Hand Traveling)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, Ohio.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Industrial Crane & Hoist Corp., 315 North Ada St., Chicago 7, Ill.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Industrial Crane & Hoist Corp., 315 North Ada St., Chicago 7, Ill.
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Industrial Crane & Hoist Corp., 315 North Ada St., Chicago 7, Ill.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES (Self-Propelled)
American Steel Dredge Co., Inc., Wayne Crane Division, 2511 Taylor Street, Fort Wayne, Ind.
Baker Raulang Company, 1250 West 80th St., Cleveland 2, Ohio.
Silent Hoist & Crane Co., 835 63rd St., Brooklyn 20, N. Y.

CRAYONS (Marking)
Markal Co., 3052 W. Carroll, Chicago 12, Ill.

CRUCIBLES
American Refractories and Crucible Corp., North Haven, Conn.
Bay State Crucible Co., Taunton, Mass.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N.Y.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Lava Crucible Co., Pittsburgh, Pa.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

CRUCIBLE FURNACES (See—FURNACES, CRUCIBLE MELTING)

CRUCIBLE POURING DEVICES
Modern Equipment Co., Port Washington, Wis.

CRUSHERS (Core)
Newaygo Engineering Co., Newaygo, Mich.
Simplicity Engineering Co., Durand, Mich.

CUPOLAS
The Grindle Corp. 16231 Turner Ave., Harvey, Ill.
Modern Equipment Co., Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLAS (Hot Blast Equipment)
The Grindle Corp. 16231 Turner Ave., Harvey, Ill.
J. O. Ross Engineering, 444 Madison Ave., New York 17, N. Y.
Whiting Corp., Harvey, Ill.

CUPOLA BLOWERS
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Roots-Connersville Blower Div., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT
Foxboro Company, Foxboro, Mass.

CUPOLA DUST ARRESTORS
Schneible Co., Claude B., 212 Stephenson Bldg., P.O. Box 81, North End Station, Detroit 2, Mich.
Whiting Corp., Harvey, Ill.

CUPOLA LIGHTERS
The Grindle Corp. 16231 Turner Ave., Harvey, Ill.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Hickman-Williams Co., Union Commerce Bldg., Cleveland 14, Ohio.
Whiting Corp., Harvey, Ill.

CUPOLA LININGS
Carborundum Co., Perth Amboy, N. J.
Cleveland Quarries Co., Amherst, Ohio.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
A. P. Green Fire Brick Co., Mexico, Missouri.
Ironton Fire Brick Co., Ironton, O.
United States Graphite Co., Saginaw, Mich.
Walsh Refractories, 101 Ferry St., St. Louis 7, Mo.

CUPOLA PATCHING GUNS
Cement Gun Co., 1520 Walnut St., Allentown, Pa.
Durex Refractories Co., P. O. Box 147, Jackson, Ohio.
Eastern Clay Products Dept. of International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.

CUPOLA SPARK ARRESTORS
Claude B. Schneible Co., 212 Stephenson Bldg., P.O. Box 81, North End Station, Detroit 2, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUTOFF CORES
American Lava Corp., Chattanooga, 5, Tenn.

CUTOFF MACHINES (Abrasive)
Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CUTTING OILS
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

CYLINDERS (Air)
Bellows Company, Akron 10, Ohio.
Hanna Engineering Works 1765 Elston Works Chicago 22, Ill.

Miller Fluid Power Co., 2040 North Hawthorne, Melrose Park, Ill.

CYLINDERS (Hydraulic)
Miller Fluid Power Co., 2040 North Hawthorne, Melrose Park, Ill.

DARK ROOM ACCESSORIES (X-Ray)
Eastman Kodak Co., Rochester, N. Y.
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

DARK ROOM PROCESSING (Chemical Tanks, etc.)
Eastman Kodak Co., Rochester, N. Y.

DEGASIFIERS
Foundry Services, Inc., 260 Madison Avenue, New York 16, N. Y
Hooker Electrochemical Co., Buffalo Avenue & 47th St., Niagara Falls, N. Y.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
National Pigment Co., Orthodox St. at Delaware River, Philadelphia 37, Pa.
Niagara Falls Smelting & Refining Div., Continental-Copper & Steel Industries, Inc., 2200-2214 Elmwood Ave., Buffalo 23, N. Y.

DEOXIDIZERS
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
National Pigment Co. Orthodox St. at Delaware River, Philadelphia 37, Pa.
Niagara Falls Smelting & Refining Div., Continental-Copper & Steel Industries, Inc., 2200-2214 Elmwood Ave., Buffalo 23, N. Y.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.

DEOXIDIZERS (Ferrous)
Carborundum Co., Perth Amboy, N. J.

DEOXIDIZING BRIQUETS
Carborundum Co., Niagara Falls, N. Y.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N. Y.

DESULPHURIZERS
American Silica Sand Co., Central Life Bldg., Ottawa, Ill.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Columbia-Southern Chemical Corp., Div., Pittsburgh Plate Glass Co., Pittsburgh 19, Pa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., 60 Mathieson Bldg., Baltimore 3, Md.
Modern Equipment Co., Port Washington, Wis.
National Pigment Co., Orthodox St. at Delaware River, Philadelphia 37, Pa.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Solvay Process Division Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DOWEL PINS
Standard Horse Nail Corp., New Brighton, Pa.

DRILLS (Electric)
Delta Power Tool Div., Rockwell Mfg. Co., Pittsburgh 8, Pa.
Mall Tool Co., 7740 So. Chicago Ave., Chicago 19, Ill.
Standard Electrical Tool Co., 2488 River Road, Cincinnati 4, Ohio.

DRILLS (Pneumatic)
Gardner-Denver Co., Quincy, Ill.
Schramm Inc., West Chester, Pa.

DRUMS (Magnetic)
Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Homer Mfg. Co., Lima, Ohio.
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

DUMP HOPPERS
Brummeler Steel Products Co., Grand Rapids, Mich.
Union Metal Mfg. Co., Canton, Ohio.

DUMP TRUCKS
Frank G. Hough Co., Libertyville, Ill.
Kwik-Mix Co., 3026 West Concordia, Milwaukee 16, Wis.
Prime Mover Co., Muscatine, Iowa.

DUST ARRESTING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Dust Suppression & Engineering Co., Lake Orein, Michigan.
Johnson March Corp., 1724 Chestnut St., Philadelphia 3, Pa.
Pangborn Corp., Hagerstown, Md.
Schneible Co., Claude B., 212 Stephenson Bldg., P.O. Box 81, North End Station, Detroit 2, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DUST COLLECTORS
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Bartlett & Snow, C. O., Co., 6101 Harvard Ave., Cleveland, O.
Dust Suppression & Engineering Co., Lake Orein, Michigan.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Schneible Co., Claude B., 212 Stephenson Bldg., P. O. Box 81, North End Station, Detroit 2, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.
Whiting Corp., Harvey, Ill.

DUST CONTROL AGENTS
Aquadyne Corp., 441 Lexington Ave., New York 17, N. Y.

DUST RECOVERY SYSTEMS
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Pangborn Corp., Hagerstown, Md.

DYES & CHEMICALS
Eaton Chemical & Dyestuff Co., 1490 Franklin, Detroit, Mich.

ELECTRIC FURNACES (see Furnaces, Electric)

ELECTRODES (Graphite and Amorphous)
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELEVATORS (Bucket)
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Jeffrey Mfg. Co., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newago Engineering Co., Newago, Mich.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

ELEVATORS (Pneumatic, Material Handling)
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Fuller Co., Catasauqua, Pa.

ENGINEERING SERVICE (Foundry)
Edwin S. Carman, 1643 Lee Road, Cleveland 18, Ohio.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
Harold E. Pridmore, Box 137, Palo Alto, Calif.
Westover Engineers, 3110 W. Fond du Lac Avenue, Milwaukee 10, Wis.

EXHAUST SYSTEMS
American Air Filter Co., Inc., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Robbins & Myers Inc., Propellair Div., Springfield, Ohio.
Schneible Co., Claude B., 212 Stephenson Bldg., P. O. Box 81, North End Station, Detroit 2, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

FABRICATORS (Metal)
Newago Engineering Co., Newago, Mich.
Penn Iron Works, Inc., Reading, Pa.

FACINGS
Acheson Colloids Co., Port Huron, Mich.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Stevens Inc., Frederic B., Detroit 16, Mich.
Superior Flake Graphite Co., 33 So. Clark St., Chicago 3, Ill.
United States Graphite Co., Saginaw, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

FANS (Ventilating, Exhaust, Cooling, etc.)
American Wheelabrator & Equipment Co., Michawaka, Ind.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Pangborn Corp., Hagerstown, Md.
Robbins & Myers Inc., Propellair Div., Springfield, Ohio.

FASTENERS (Conveyor Belt)
Flexible Steel Lacing Co., 4667 Lexington St., Chicago 44, Illinois.

FEEDERS (Belt)
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
Robins Conveyors, Div. Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

FEEDERS (Rotary)
Fuller Company, Catasauqua, Pa.
Great Western Mfg. Co., Leavenworth, Kansas.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Newago Engineering Co., Newago, Mich.

FEEDERS (Sand)
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Newago Engineering Co., Newago, Mich.

FEEDERS (Vibrating)
Link-Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
Robins Conveyors, Div. Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

FERROBORON
Electro Metallurgical Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROCHROME
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Hickman-Williams & Co., Cleveland, O.
Ohio Ferro-Alloys Corp. Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROCOLUMBIUM
Electro Metallurgical Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

FERROMANGANESE
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

FERROMOLYBDENUM
Molybdenum Corporation of America, Pittsburgh 19, Pa.

FERROSILICON
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Globe Iron Co., Jackson, Ohio
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of American, 420 Lexington Ave., New York, N. Y.

FERROTITANIUM
Electro Meallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Titanium Alloy Mfg. Div. National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROTUNGSTEN
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROVANADIUM
Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FILM (X-Ray)
Eastman Kodak Co., Rochester, N. Y.
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

FILTERS (Air)
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.

FIRE BRICK
Babcock & Wilcox Co., 161 E. 42nd St., New York 17, N. Y.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N. Y.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., Joliet, Ill.
Norton Co., Worcester 6, Mass.
Stevens Inc., Frederic B., Detroit 16, Mich.
Walsh Refractories, 101 Ferry St., St. Louis 7, Mo.

FIRE CLAY
Cedar Heights Clay Co., Oak Hill, Ohio.
Durex Refractories Co., P. O. Box 147, Jackson, Ohio.
Eastern Clay Products, Dept. International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

FIRE SAND
Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., Amherst, Ohio.
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.

FIRESTONE
Cleveland Quarries Co., Amherst, Ohio.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.

FLASK BANDS
The Adams Co., Dubuque, Iowa.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

FLASK BUSHINGS
The Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 6, Mo.
Hines Flask Co., 3431 W. 140 St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

FLASK PINS
The Adams Co., Dubuque, Iowa.
Black,Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 6, Mo.
Goehringer Foundry Supply Co., 919 West Fifth St., Cincinnati 3, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Universal Engineering Co., Frankenmuth, Mich.

FLASKS (Aluminum, Magnesium)
Adams Co., Dubuque, Iowa.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, O.

FLASKS (Slip)
Adams Co., Dubuque, Iowa.
Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, O.

FLASKS (Snap)
Adams Co., Dubuque, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Stevens, Inc., Frederic B., Detroit 16, Mich.

FLASKS (Steel)
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 6, Mo.
Pressed Steel Div., Republic Steel Corp., 6100 Truscon Ave., Cleveland, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

FLASKS (Wood)
Adams Co., Dubuque, Iowa.

FLASK FILLERS
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., Columbus 16,0.

FLASK FITTINGS
Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 6, Mo.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio.

FLASK LIFT MACHINES
The Adams Co., Dubuque, Iowa.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

FLEXIBLE COUPLINGS
Ajax Flexible Coupling Co., Westfield, N. Y.
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.

FLOORING
Norton Co., Worcester 6, Mass.

FLUXES
Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Foundry Services, Inc., 260 Madison Avenue, New York 16, N. Y.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
National Pigment Co., Orthodox St. at Delaware River, Philadelphia 37, Pa.
Niagara Falls Smelting & Refining Div., Continental-Copper & Steel Industries Inc., 2200-2214 Elmwood Ave., Buffalo 23, N. Y.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.

FLUXES (Soldering, Welding & Tinning)
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

FOUNDRY ENGINEERS (See ENGINEERING SERVICE)

FOUNDRY LAYOUT & METHODS
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

FOUNDRY NAILS
Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Standard Horse Nail Corp., New Brighton, Pa.

FOUNDRY SHOVELS (See SHOVELS)

FOUNDRY SUPPLY HOUSES
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Eastern Clay Products, Dept. International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundries Materials Co., Coldwater, Mich.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Stevens, Inc., Frederic B., Detroit 16, Mich.

FURNACES (Aluminum & Magnesium Billets)
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Morrison Engrg. Co., Wickliffe, Ohio.

FURNACES (Aluminum & Magnesium Forgings)
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

FURNACES (Aluminum Melting)
Ajax Engineering Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.

FURNACES (Annealing)
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Electric Furnace Co., West Wilson St., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Mahr Manufacturing Co., Div. Diamond Iron Works Inc., Minneapolis 11, Minn.

FURNACES (Crucible Melting)
Ajax Electrothermic Corp., Trenton, N. J.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Electric Melting)
Ajax Electric Furnace Corp., 46 Richmond St., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.

Ajax Engineering Corp., Trenton, N. J.
American Bridge Co., Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P.O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Gas or Oil Fired)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Electric Furnace Co., West Wilson St., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Reda Pump Co., Bartlesville, Okla.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Gray Iron Melting)

American Bridge Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P.O. Box 1125, Pittsburgh, Pa.
Reda Pump Co., Bartlesville, Oklahoma.
Whiting Corp., Harvey, Ill.

FURNACES (Heat Treating)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Electric Furnace Co., West Wilson St., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Mahr Manufacturing Co., Div. Diamond Iron Works Inc., Minneapolis 11, Minn.
Ohio Crankshaft Co., Tocco Division, 4620 E. 71st St., Cleveland 5, Ohio.

FURNACES, HEAT TREATING (Electric)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
The Grindle Corp., 16231 Turner Ave., Harvey, Ill.

FURNACES (Induction Heating)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ohio Crankshaft Co., Tocco Division, 4620 E. 71st St., Cleveland 5, Ohio.

FURNACES (Malleable Annealing)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Electric Furnace Co., West Wilson St., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Malleable Melting)

American Bridge Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.
Grindle Corp., 16231 Turner Ave., Harvey, Ill.
Pittsburgh Lectromelt Furnace Corp., P.O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Nonferrous Melting)

Ajax Electrothermic Corp., Trenton, N. J
Ajax Engineering Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Morrison Engrg. Co., Wickliffe, Ohio.
Reda Pump Co., Bartlesville, Oklahoma.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Powdered Coal)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Steel Melting)

Ajax Electrothermic Corp., Trenton, N. J.
American Bridge Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.
Detroit Electric Furnace Div., of Kuhlman Electric Co., Bay City, Mich.
Morrison Engrg. Co., Wickliffe, Ohio.
Pittsburgh Lectromelt Furnace Corp., P.O. Box 1125, Pittsburgh, Pa.
Whiting Corp., Harvey, Ill.

FURNACE BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

FURNACE LININGS

Campbell-Hausfeld Co., Harrison, O.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N.Y.
A. P. Green Fire Brick Co., Mexico, Missouri.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
National Carbon Co. Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.
Titanium Alloy Mfg. Div., National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.
United States Graphite Co., Saginaw, Mich.

GAGGERS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

GANISTER

Western Materials Co., 39 S. LaSalle St., Chicago, Ill.

GAS (Oxygen, Acetylene, Industrial)

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

GAS BURNERS

Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard St., Chicago 12, Ill.

GENERATORS (Acetylene)

Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

GLOVES (Industrial, Safety)

American Optical Co., Southbridge, Mass.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
United States Rubber Co., 4300 New Haven Ave., Ft. Wayne 4, Ind.

GOGGLES and EYE PROTECTORS

American Optical Co., Southbridge, Mass.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
B. F. McDonald Co., 5721 West 96th St., Los Angeles 37, Calif.
Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.
Willson Products Inc., Reading, Pa.

GRAPHITE

Acheson Colloids Co., Port Huron, Mich.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.
National Carbon Co. Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Superior Flake Graphite Co., 33 So. Clark St., Chicago 3, Ill.
United States Graphite Co., Saginaw, Mich.

GRAPHITIZER

United States Graphite Co., Saginaw, Mich.

GRINDERS (Electric Portable)

Bradford Machine Tool Co., 657 Evans St., Cincinnati 4, Ohio.
Buckeye Tools Corp., 29 West Apple St., Dayton 2, Ohio.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Chicago Wheel & Mfg. Co., 1101 W. Monroe, Chicago 7, Ill.
Mall Tool Co., 7740 So. Chicago Ave., Chicago 19, Ill.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, Ohio.
Standard Electrical Tool Co., 2488 River Road, Cincinnati 4, Ohio.
Thor Power Tool Co., Aurora, Ill.

GRINDERS (Flexible Shaft)

Chicago Wheel & Mfg. Co., 1101 W. Monroe, Chicago 7, Ill.
Mall Tool Co., 7740 So. Chicago Ave., Chicago 19, Ill.

GRINDERS (Pneumatic Portable)

Aro Equipment Corp., Bryan, Ohio.
Buckeye Tools Corp., 29 West Apple St., Dayton 2, Ohio.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Tex.
Keller Tool Co., Grand Haven, Michigan.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, Ohio.
Thor Power Tool Co., Aurora, Ill.

GRINDERS (Surface, Bench, Disc, Floor)

Bradford Machine Tool Co., 657 Evans St., Cincinnati 4, Ohio.
Chicago Wheel & Mfg. Co., 1101 W. Monroe, Chicago 7, Ill.
Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Mall Tool Co., 7740 So. Chicago Ave., Chicago 19, Ill.
Standard Electrical Tool Co., 2488 River Road, Cincinnati 4, Ohio.
Thor Power Tool Co., Aurora, Ill.

GRINDERS (Swing Frame)

Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Sutter Products Co., Dearborn, Mich.

GRINDING WHEELS—See ABRASIVE WHEELS

GRINDING WHEEL DRESSERS

Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., 1101 W. Monroe, Chicago 7, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.

GRINDSTONES

Bay State Abrasive Products Co., Westboro, Mass.
Cleveland Quarries Co., Amherst, Ohio.
Sterling Abrasive Division, Cleveland Quarries Co., Tiffin, Ohio.

GRIT (Abrasive)

Abrasive Shot and Grit Company, Springville, New York.
Alloy Metal Abrasive Co., Ann Arbor, Mich.
American Steel Abrasives Co., Galion, O.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carborundum Co., Niagara Falls, N. Y.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Mich.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.

HAMMERS (Chipping)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Michigan.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Schramm Inc., West Chester, Pa.
Thor Power Tool Co., Aurora, Ill.

HARDNESS TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.

HEAT CONTROL AND RECORDING DEVICES

Claude S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
The Grindle Corp., 16231 Turner Ave., Harvey, Ill.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

HEATERS (Gas, Oil, Electric)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Cleveland Process Co., 1965 East 57th St., Cleveland 3, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Herman Nelson Division, American Air Filter Co., Inc., Louisville 8, Kentucky.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
J. O. Ross Engineering Corp., 444 Madison Ave., New York 17, N. Y.
Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

HEATERS (High Frequency Electric)

Ajax Electrothermic Corp., Trenton, N. J.

HEATERS (Indirect Fired)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

HEATERS (Space, Unit)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Drying Systems, Inc., 1800 W. Foster Ave., Chicago 40, Ill.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

HELMETS (Blasting)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Optical Co., Southbridge, Mass.
B. F. McDonald Co., 5721 West 96th St., Los Angeles 37, Calif.
Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

HELMETS (Welding)

American Optical Co., Southbridge, Mass.

HOISTS (Air)

Aro Equipment Corp., Bryan, Ohio.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Curtis Pneumatic Machinery Div. Curtis Mfg. Co., 1905 Kienlen Ave., St. Louis 20, Mo.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Michigan.
Miller Fluid Power Co., 2040 North Hawthorne, Melrose Park, Ill.

HOISTS (Chain)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa.

HOISTS (Electric)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Detroit Hoist & Machine Co., 8200 Morrow Ave., Detroit 11, Mich.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.
Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa.

HOISTS (Hand)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Manning, Maxwell & Moore, Inc., Muskegon, Mich.

HOISTS (Skip)

Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Gardner-Denver Co., Quincy, Ill.
Link Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

HOODS (Shakeout, Pouring & Cooling)

Claude B. Schneible Co., 212 Stephenson Bldg., P.O. Box 81, North End Station, Detroit 2, Mich.

HOSE (Air, Blasting, Water, Gas)

Gardner-Denver Co., Quincy, Ill.
B. F. Goodrich Co., Akron, Ohio.
Hewitt Rubber Div. Hewitt-Robins Div., Inc., 240 Kensington Ave., Buffalo 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pangborn Corp., Hagerstown, Md.
Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.
Schramm Inc., West Chester, Pa.

HOSE FITTINGS

A. Schrader's Son, 417 Vanderbilt Ave., Brooklyn 17, N. Y.

HOSE REELS

A. Schrader's Son, 470 Vanderbilt Ave., Brooklyn 17, N. Y.

HYDRAULIC CLEANING EQUIPMENT

The Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Illinois.
Pangborn Corp., Hagerstown, Md.

HYDRO FINISHING EQUIPMENT

Pangborn Corp., Hagerstown, Md.

IDENTIFICATION PENCILS

Markal Co., 3052 W. Carroll, Chicago 12, Ill.

ILLUMINATORS (X-Ray Films)

Eastman Kodak Co., Rochester, N. Y.

IMPREGNATING SYSTEMS

The Patterson-Kelley Co. Inc., East Stroudsburg, Pa.
Tincher Products Co., Sycamore, Ill.

INDUSTRIAL ENGINEERING SERVICE

Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

INGOT MOLDS

Acme Foundry Co., Detroit 16, Mich.
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

INGOTS (Magnesium)

Christiansen Corp., 210 South Marion, Oak Park 1, Ill.

INGOTS (Nonferrous)

Aluminum Smelters Research Institute, 20 North Wacker Drive, Chicago 6, Ill.
Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Belmont Smelting & Refining Works, 330 Belmont Ave., Brooklyn, N.Y.
Christiansen Corp., 210 South Marion, Oak Park 1, Ill.
Federated Metals Div. of American Smelting & Refining Co., 120 Broadway, New York 5.
Frontier Bronze Corp., 818 Elmwood Ave., Niagara Falls, N. Y.
International Nickel Co., Inc., 67 Wall St., New York City 5.
R. Lavin & Sons Inc., 3426 So. Kedzie Ave., Chicago 23, Ill.
Sonken-Galamba Corp., Kansas City 18, Kans.
Western Metal Co., 3201 So. Kedzie Ave., Chicago 23, Ill.

INOCULANTS

Carborundum Co., Perth Amboy, N. J.
United States Graphite Co., Saginaw, Mich.

INSERTS (Ceramic)

American Lava Corp., Chattanooga 5, Tenn.

IRON CEMENT

Smooth-On Mfg. Co., 570 Communipaw Ave., Jersey City 4, N. J.

IRON ORE

Pickands, Mather & Co., Cleveland 14, O.

IRON OXIDES

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Tamms Industries Inc., 228 No. La Salle St., Chicago 1, Ill.

JACKETS (Mold)

Adams Co., Dubuque, Iowa.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

LABORATORY EQUIPMENT (Chemical)

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Great Western Mfg. Co., Leavenworth, Kansas.

LABORATORY EQUIPMENT (Physical)

Buehler Ltd., 2120 Greenwood Ave., Evanston, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Claude S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Norton Co., Worcester 6, Mass.

LADLES

Grindle Corp., 16231 Turner Ave., Harvey, Ill.
Industrial Equipment Co., Minster, O.
Modern Equipment Co., Port Washington, Wis.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

LADLE LININGS

Botfield Refractories, 786 S. Swanson St., Philadelphia 47, Pa.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, Ohio.
Johns-Manville, 22 East 40th St., New York 16, N. Y.
United States Graphite Co., Saginaw, Mich.
Walsh Refractories, 101 Ferry St., St. Louis 7, Mo.

LEAD

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

LIFT TRUCKS (See Trucks, Power Lift)

LINSEED OIL

Hercules Powder Co., Wilmington 99, Del.
United Oil Co., Erie, Pa.

LOADERS

Barber-Green Co., Aurora, Ill.
Clearfield Machine Co., Clearfield, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

LOADERS (Front-End)

Baker-Lull Corp., 314 West 90th St., Minneapolis 20, Minn.
Frank G. Hough Co., Libertyville, Ill.

LOADERS (Tractor-Mounted)

Frank G. Hough Co., Libertyville, Ill.

LUBRICANTS (Industrial)

Acheson Colloids Co., Port Huron, Mich.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Swan-Finch Oil Corp., 205 East 42nd St., New York 17, N. Y.
United Oil Mfg. Co., Erie, Pa.
United States Graphite Co., Saginaw, Mich.

MACHINE KEYS

Standard Horse Nail Corp., New Brighton, Pa.

MAGNESIUM INGOTS

Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

MAGNET CONTROLLERS

Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Ohio.

MAGNETS

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Homer Mfg. Co., Lima, Ohio.
Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Ohio.
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

MARKING CRAYONS

Markal Co., 3052 W. Carroll, Chicago 12, Ill.

MATCHPLATE METAL

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.

MATCHPLATES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
City Pattern Foundry & Machine Co., 1165 Harper, Detroit 11, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.

MECHANICAL ENGINEERS

Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.

MELTING POTS

Acme Foundry Co., Detroit 16, Mich.

METAL CLEANING EQUIPMENT

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

METALLOGRAPHIC EQUIPMENT

Buehler Ltd., 2120 Greenwood Ave., Evanston, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

METALLURGICAL CHEMISTS

Chas. C. Kawin Co., 431 S. Dearborn St., Chicago 5, Ill.

METALLURGISTS

Crobaugh Co., Frank L., 1426 West Third St., Cleveland 13, Ohio.

METERS (Gas, Air, Water)

Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Roots-Connersville Blower Div., Connersville, Ind.

MICROSCOPES

Buehler Ltd., 2120 Greewood Ave., Evanston, Ill.

MIXERS (Core Wash)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

MIXERS (Sand and Clay)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
The Patterson-Kelley Co. Inc., East Stroudsburg, Pa.
Posey Iron Works, Inc., Lancaster, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

MOLD CONVEYORS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newago Engineering Co., Newago, Mich.

MOLD DRYERS

Burdett Mfg. Co., 3433 W. Madison, Chicago 7, Ill.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.

MOLD OVENS and DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Drying Systems, Inc., 1800 W. Foster Ave., Chicago 40, Ill.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Michigan Oven Co., 419 Brainard St., Detroit 1, Mich.
Morrison Engrg. Co., Wickliffe, Ohio.
J. O. Ross Engineering Corp., 444 Madison Ave., New York 17, N. Y.
Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

MOLD SEAL COMPOUND

Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

MOLD WASH

Acheson Colloids Co., Port Huron, Mich.
M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Services, Inc., 260 Madison Avenue, New York 16, N. Y.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Pennsylvania Pulverizing Co., 140 Stanwix St., Pittsburgh 22, Pa.
Frederic B. Stevens, Inc. 18th St. & Vernor Highway, Deroit 16, Mich.
Superior Flake Graphite Co. 33 So. Clark St., Chicago 3, Ill.
United Oil Co., Erie, Pa.
United States Graphite Co., Saginaw, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

MOLDING MACHINES

Adams Co., Dubuque, Iowa.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Div., Pettibone-Mulliken Corp., 2424 No. Cicero Ave., Chicago 39, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3328 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Shalco Engineering Corp., Palo Alto, Calif.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Sutter Products Co., Dearborn, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Jolt)

Adams Co., Dubuque, Iowa.
Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Div., Pettibone-Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3328 Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Rollover)

Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co. Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Div., Pettibone-Mulliken Corp., 2424 No. Cicero Ave., Chicago 39, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3328 Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Sutter Products Co., Dearborn, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Squeeze)

Adams Co., Dubuque, Iowa.
Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Div., Pettibone-Mulliken Corp., 2424 No. Cicero Ave., Chicago 39, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3328 Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING SANDS

American Silica Sand Co., Central Life Bldg., Ottawa, Ill.
Foundries Materials Co., Coldwater, Mich.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.
Ottawa Silica Co., Ottawa, Ill.
Pennsylvania Glass Sand Corp., 140 Stanwix St., Pittsburgh 22, Pa.
Sargent Sand Co., 2840 Bay Road, Saginaw, Mich.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

MOLYBDENUM

Molybdenum Corporation of America, Pittsburgh 19, Pa.

MONORAIL SYSTEMS

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1125 East 283rd St., Wickliffe, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., Harvey, Ill.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Baldor Electric Co., 325 West Huron St., Chicago 10, Ill.
Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Ohio.

MOUNTING PADS

Fabreeka Products, Inc., 222 Summer St., Boston 10, Mass.

MULLERS (See Sand Mixers)

NAILS (Chill)

Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.
Standard Horse Nail Corp., New Brighton, Pa.

NICKEL

International Nickel Co., Inc., 67 Wall St., New York City 5.

NITROGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

NOZZLES (Blasting)

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Davenport Machine & Foundry Co., Davenport, Iowa
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Norton Co., Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

OIL BURNERS

Hauck Manufacturing Co., 106 Tenth St., Brooklyn 15, N.Y.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

OPEN HEARTH DOORS

Wm. M. Bailey Co., Pittsburgh 16, Pa.

OPTICAL PYROMETERS

Buehler Ltd., 2120 Greenwood Ave., Evanston, Ill.

OVENS (Annealing and Heat Treating)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Electric Furnace Co., West Wilson St., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Industrial Ovens Inc., 13825 Triskett Rd., Cleveland 11, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Morrison Engrg. Co., Wickliffe, Ohio.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

OVENS (Core) (See CORE OVENS)

OVENS (Enameling, Japanning)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Industrial Ovens Inc., 13825 Triskett Rd., Cleveland 11, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Michigan Oven Co., 419 Brainard, Detroit 1, Mich.

OVENS (Mold Drying) (See MOLD OVENS)

OXYGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

PARTING COMPOUND (Silicone)

Dow Corning Corp., Midland, Mich.

PARTING COMPOUNDS

Acheson Colloids Co., Port Huron, Mich.

Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Goehringer Foundry Supply Co., 919 West Fifth St., Cincinnati 3, Ohio.
R. B. Harrison, Box 1053, Reading, Pa.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Superior Flake Graphite Co., 33 So. Clark St., Chicago 3, Ill.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.
United Oil Co., Erie, Pa.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

PATTERN COATINGS

Acheson Colloids Co., Port Huron, Mich.
American Lacquer Solvents Co., Phoenixville, Pa.

PATTERN COATINGS (Metallic)

M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.

PATTERN COMPOUND

Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN LETTERS

Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.

PATTERN LUMBER

Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.

PATTERN METAL

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.
Niagara Falls Smelting & Refining Div., Continental-Copper & Steel Industries Inc., 2200-2214 Elmwood Ave., Buffalo 23, New York.

PATTERN PLATES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
City Pattern Foundry & Machine Co., 1165 Harper, Detroit 11, Mich.
Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.
Wellman Bronze & Aluminum, 12800 Shaker Blvd., Cleveland 20, Ohio.

PATTERN SHOP EQUIPMENT

Chicago Wheel & Mfg. Co., 1101 W. Monroe Chicago 7, Ill.
Freeman Supply Co., 1152 East Broadway Toledo, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.

PATTERNS (Wood, Metal)

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Anderson Pattern Inc., Muskegon Heights, Mich.
Automotive Pattern Co., 1884 John R. Street, Detroit 3, Michigan.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
City Pattern Foundry & Machine Co., 1165 Harper, Detroit 11, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Master Pattern Co., 1315 Main Ave., Cleveland, O.
S.P.O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Wellman Bronze & Aluminum Co., 12800 Shaker Blvd., Cleveland 20, O.

PERMANENT MOLDS

Centrifugal Casting Machine Co., Tulsa, Okla.
Great Lakes Carbon Corp., Hancock Bldg., Niagara Falls, N. Y.
Master Pattern Co., 1315 Main Ave., Cleveland, O.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

PHOSPHOR COPPER

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.
Niagara Falls Smelting & Refining Div., Continental-Copper & Steel Industries Inc., 2200-2214 Elmwood Ave., Buffalo 23, New York.

PHOTOGRAPHIC EQUIPMENT

Eastman Kodak Co., Rochester, N. Y.
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

PHOTOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.

PIG CASTING MACHINES

Wm. M. Bailey Co., Pittsburgh 16, Pa.

PIG IRON

Globe Iron Co., Jackson, Ohio.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Pickands, Mather & Co., Cleveland 14, O.
Pittsburgh Coke & Chemical Co., Grant Building, Pittsburgh 19, Pa.
Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.
Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)

Globe Iron Co., Jackson, Ohio.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.

PINS (Flask)

The Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 3, Mo.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Pressed Steel Div., Republic Steel Corp., 6100 Truscon Ave., Cleveland, Ohio.
Universal Engineering Co., Frankenmuth, Mich.

PISTON RINGS (for Molding Machines, Compressors, etc.)

Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.

PITCH

M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

PLANT ENGINEERING SERVICE

Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

PLATES (Bottom)

Adams Co., Dubuque, Iowa.
Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 3, Mo.
Christiansen Corp., 210 South Marion, Oak Park 1, Ill.
Shanafelt Mfg. Co., Canton, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

PLATES (Core Drying)

Black, Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 3, Mo.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Christiansen Corp., 210 South Marion, Oak Park 1, Ill.
Johns-Manville, 22 East 40th St., New York 16, N. Y.

PLUMBAGO

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

PNEUMATIC TOOLS

Aro Equipment Corp., Bryan, Ohio.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Michigan.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, Ohio.
Schramm Inc., West Chester, Pa.
Thor Power Tool Co., Aurora, Ill.

POURING DEVICES

Industrial Equipment Co., Minster, Ohio.
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

PRESSER BOARDS

Adams Co., Dubuque, Iowa.
Christiansen Corp., 210 South Marion, Oak Park 1, Ill.

PRESSURE RECORDERS

Foxboro Company, Foxboro, Mass.

PROTECTIVE MATERIALS (X-Ray)

General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

PULLEYS (Magnetic)

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Homer Mfg. Co., Lima, Ohio.
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

PUMPS

Gardner-Denver Co., Quincy, Ill.

PUMPS (Dry, Vacuum)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Fuller Company, Catasauqua, Pa.
Roots-Connersville Blower Div., Connersville, Ind.

PUSH-OFF MACHINES

The Adams Co., Dubuque, Iowa.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3238 W. Pierce St., Milwaukee 4, Wis.

PUTTY (Foundry)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

PYROMETERS

Foxboro Company, Foxboro, Mass.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Claude S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., Bergenfield, N. J.

RACKS (Core Ovens)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

RADIOGRAPHIC (Inspection)

Industrial X-Ray, Inc. W. Hempstead, N. Y.

RADIOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.
Radium Chemical Co., Inc., 161 East 42nd St., New York 17, N. Y.
Technical Operations Inc., 6 Schouler Court, Arlington 74, Mass.
Tracerlab, Inc., 130 High Street, Boston 10, Mass.

RADIUM

Radium Chemical Co., Inc. 161 East 42nd St., New York 17, N. Y.

REFRACTORIES

Babcock & Wilcox Co., 161 E. 42nd St., New York 17, N. Y.
Carborundum Co., Niagara Falls, N. Y.
Carborundum Co., Perth Amboy, N. J.
Cedar Heights Clay Co., Oak Hill, Ohio.
Cleveland Quarries Co., Amherst, Ohio.
Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 N. Wacker Dr., Chicago 6, Ill.
Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N.Y.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
A. P. Green Fire Brick Co., Mexico, Missouri.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Norton Co., Worcester 6, Mass.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Richard C. Remmey Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Titanium Alloy Mfg. Div., National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.
United States Graphite Co., Saginaw, Mich.
Walsh Refractories, 101 Ferry St., St. Louis 7, Mo.

RESIN (Shell Mold)

Acme Resin Corp., Forest Park, Ill.
Bakelite Corp., 300 Madison Ave., New York 17, N. Y.
Barrett Division, Allied Chemical & Dye Corp., 40 Rector Street, New York 6, N. Y.
Durez Plastics & Chemicals Inc., North Tonawanda, N. Y.
General Electric Co., Pittsfield, Mass.
Hercules Powder Co., Wilmington 99, Del.
Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.
Reichhold Chemical Co., 525 North Broadway, White Plains, N. Y.
Schenectady Resins, P.O. Box 1046, Schenectady, New York.
Specialty Products, 190 Warren St., Jersey City, N. J.

RESPIRATORS

Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.
Wilson Products Inc., Reading, Pa.

RIDDLES (Electric)

Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kans.

RIDDLES (Hand)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Western Mfg. Co., Leavenworth, Kansas.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

RISER COMPOUNDS

Foundry Services, Inc., 260 Madison Avenue, New York 16, N. Y.

ROD STRAIGHTENERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

ROLLER-HEARTH FURNACES (Electric Annealing)

General Electric Co., Schenectady, N. Y.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.

RUBBER LINING MATERIAL (Abrasive Resisting)

B. F. Goodrich Co., Akron, Ohio.
Pangborn Corp., Hagerstown, Md.

SAFETY CLOTHING

American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
B. F. McDonald Co., 5721 West 96th St., Los Angeles 37, Calif.
Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.
Pangborn Corp., Hagerstown, Md.
Wheeler Protective Apparel, Inc., 224 West Huron St., Chicago 10, Ill.

SALT & SALT TABLETS

Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.

SAND (Core, Molding, Blasting)

American Silica Sand Co., Central Life Bldg., Ottawa, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Clayton Silica Co., 405 Granby Bldg., Cedar Rapids, Iowa.
Derby & Co., 551 Fifth Ave., New York 17, N. Y.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Nugent Sand Co., Muskegon, Mich.
Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.
Ottawa Silica Co., Ottawa, Ill.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Glass Sand Corp., 140 Stanwix St., Pittsburgh 22, Pa.
Producers Core Sand Corp., Michigan City, Ind.
Sargent Sand Co., 2840 Bay Road, Saginaw, Mich.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Titanium Alloy Mfg. Div., National Lead Co., Hyde Park Blvd., Niagara Falls, N. Y.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.
Western Materials Co., 39 S. LaSalle St., Chicago, Ill.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

SAND BLAST BARRELS

American Wheelabrator & Equipment Co., 505 S. Eyrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
W. W. Sly Mfg. Co., 4753 Train Ave., Louisville 8, Ky.

SAND BLAST EQUIPMENT

American Air Filter Co., 266 Central Ave., Cleveland 2, Ohio.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
The Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

SAND BLAST NOZZLES

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Norton Company, Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

SAND BLAST ROOMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

SAND BLAST TABLES

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co. 4753 Train Ave., Cleveland 2, Ohio.

SAND CONTROL & TESTING EQUIPMENT

Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Claude S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND CONVEYING and HANDLING EQUIPMENT

Ajax Flexible Coupling Co., Westfield, N. Y.
American Air Filter Co., Louisville 8, Ky.
American Conveyor Co., 1115 West Adams St., Chicago 7, Ill.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Clearfield Machine Co., Clearfield, Pa.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Crane Co., 836 South Michigan, Chicago 5, Ill.
Gerotor May Corp., Maryland Avenue & Oliver, Baltimore, Md.
Gerwin Industries, 214 Spring St., Michigan City, Indiana.
B. F. Goodrich Co., Akron, Ohio.
Frank G. Hough Co., Libertyville, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
Pekay Machine & Engineering Co., 865 N. Sangamon St., Chicago 22, Ill.
Penn Iron Works, Inc., Reading, Pa.
Prime Mover Co., Muscatine, Iowa.
Robins Conveyors Div. Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Pneumatic)

Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Crane Co., 836 South Michigan, Chicago 5, Illinois.
Fuller Company, Catasauqua, Pa.
Gerwin Industries, 214 Spring St., Michigan City, Indiana.

SAND DRYERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, Ohio.
Crane Co., 836 South Michigan Ave., Chicago 5, Ill.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y.

SANDING MACHINERY (Disc, Spindle, Belt, etc.)

Cleco Division of Reed Roller Bit Co., Houston, Texas.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAND MEASURING and WEIGHING DEVICES

Baker Perkins Inc., Saginaw, Mich.
Link-Belt Co., 307 North Michigan Ave., Chicago 5, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND MIXERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
The Moulders Friend, Dallas City, Ill.
Muller Machinery Co., Metuchen 1, N. J.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
The Patterson-Kelley Co. Inc., East Stroudsburg, Pa.
Pekay Machine & Engineering Co., 865 N. Sangamon St., Chicago 22, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Standard Sand & Machine Co., Blystone Division, 549 W. Washington Blvd., Chicago 6, Ill.

SAND PREPARATION EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio.
The Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Illinois.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
Moulders Friend, Dallas City, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Pekay Machine & Engineering Co., 865 N. Sangamon St., Chicago 22, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.
States Engineering Corp., 922 W. Berry, Ft. Wayne 2, Ind.

SAND RAMMERS

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Michigan.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, Ohio.

SAND RECLAIMERS

Hydro Blast Corp., 2550 N. Western, Chicago 47, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y.
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

SAND SIFTING and SCREENING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Carrier Conveyor Corp., Frankfort Ave. at Clifton, Louisville 6, Ky.
Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
The Moulders Friend, Dallas City, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Pangborn Corp., Hagerstown, Md.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SAND STORAGE BINS & GATES

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.

Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Neff & Fry Co., Camden, Ohio.
Newaygo Engineering Co., Newaygo, Mich.

SAWS (Band, Metal, Wood)

Delta Power Tool Div., Rockwell Mfg. Co., Pittsburgh 8, Pa.
Oliver Machinery Company, Grand Rapids 2, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

SCALING HAMMERS

Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Michigan.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, Ohio.
Schramm, Inc., West Chester, Pa.

SCREENS (Shake-Out)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Carrier Conveyor Corp., Frankfort Ave. at Clifton, Louisville 6, Ky.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Carrier Conveyor Corp., Frankfort Ave. at Clifton, Louisville 6, Ky.
Great Western Mfg. Co., Leavenworth, Kansas.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Simplicity Engineering Co., Durand, Mich.

SEA COAL

M. A. Bell Co., 217 Lombard St., St. Louis 2, Mo.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

SEPARATORS (Air, Moisture, Oil)

R. P. Adams Co., 227 East Park Drive, Buffalo 17, New York.
American Air Filter Co., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Logan Engineering Co., 4901 Lawrence Ave., Chicago 30, Ill.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.
A. Schrader's Son, 470 Vanderbilt Ave., Brooklyn 17, N. Y.

SEPARATORS (Magnetic)

Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Homer Mfg. Co., Lima, Ohio.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Stearns Magnetic Mfg. Co., 635 S. 28th St., Milwaukee 46, Wis.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
The Branford Co., 131 Chestnut St., New Haven 7, Conn.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 9, Ill.
Robins Conveyors, Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHELL MOLDING (Equipment & Accessories)

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Safety Vulcanizer Co., 4145 Cottage Grove Ave., Chicago 15, Ill.
Shalco Engineering Corp., Palo Alto, Calif.
Shell Process Inc., McKinstry Ave., Chicopee, Mass.
Sutter Products Co., Dearborn, Mich.
Tyler Metal Products Co., 1101 Tyler St., St. Louis 6, Mo.

SHELL MOLD SAND

Acme Resin Corp., Forest Park, Ill.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Pennsylvania Glass Sand Corp., 140 Stanwix St., Pittsburgh 22, Pa.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

SHELL MOLDS—See RESIN

SHOCK ABSORBING PADS

Fabreeka Products, Inc., 222 Summer St., Boston 10, Mass.

SHOT AND GRIT

Abrasive Shot and Grit Company, Springville, New York.
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Steel Abrasives Co., Galion, O.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Mich.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOT (Peening)

Abrasive Shot and Grit Company, Springville, New York.
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Steel Abrasive Co., Galion, O.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOVELS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.

SHOVELS (Power)

Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Frank G. Hough Co., Libertyville, Ill.

SILICA FLOUR

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, O.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Pennsylvania Pulverizing Co., 140 Stanwix St., Pittsburgh 22, Pa.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SILICOMANGANESE

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

SILICON (Briquets)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, Ohio.

SILICON CARBIDE (Briquets)

Electro Refractories & Abrasive Corp., Vars Bldg., Buffalo 2, N.Y.

SILVERY PIG IRON see Pig Iron (Silvery)

SLAG DISPOSAL UNIT

American Conveyor Co., 1115 West Adams St., Chicago 7, Ill.

SLIP FLASKS (See FLASKS, SLIP)

SLINGS (Chain)

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Jeffrey Mfg. Co., Columbus 16, O.
S. G. Taylor Chain Co., Hammond, Indiana.

SLIP JACKETS

Adams Co., Dubuque, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

SMELTERS & REFINERS

Christiansen Corp., 210 South Marion, Oak Park 1, Ill.
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.
R. Lavin & Sons Inc., 3426 So. Kedzie Ave., Chicago 23, Ill.
Western Metal Co., 3201 So. Kedzie Ave., Chicago 23, Ill.

SNAGGING MACHINES—See ABRASIVE WHEELS

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS—See FLASKS (Snap)

SODA ASH

Columbia-Southern Chemical Corp., Div., Pittsburgh Plate Glass Co., Pittsburgh 19, Pa.
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
Solvay Process Division, Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.

SOLDER

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

SPECTROGRAPHIC ANALYSES

Chas. C. Kawin Co., 431 South Dearborn St., Chicago 5, Ill.

SPRAY GUNS

The Branford Co., 131 Chestnut St., New Haven 7, Conn.
Murphy & Co., Jas. A., Hamilton, O.

SPRUE CUTTERS

Adams Co., Dubuque, Iowa.
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.

STEEL SHOT

Abrasive Shot and Grit Company, Springville, New York.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Pangborn Corp., Hagerstown, Md.
Steel Shot Producers, Inc., Butler, Pa.

STEEL (Structural)

American Bridge Co., Div. United States Steel Corp., 52 S. Wm. Penn Place, Pittsburgh 19, Pa.

STRAINER CORES

American Clay Forming Co., Tiffin, Ohio.
American Lava Corp., Chattanooga 5, Tenn.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Porcelain Products, Inc., Findlay, Ohio.

STRIPPING MACHINES

Adams Co., Dubuque, Iowa.
Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Div., Spo Inc., 3238 W. Pierce St., Milwaukee 4, Wis.

TANK TRAPS

Jas. A. Murphy & Co., Hamilton, Ohio.

TANKS (Dewatering)

Claude B. Schneible Co., 212 Stephenson Bldg., P. O. Box 81, North End Station, Detroit 2, Mich.

TAPPING MACHINES

Cleveland Tapping Machine Co., Canton 6, Ohio.

TELLURIUM

American Smelting & Refining Co., 120 Broadway, New York 5, N.Y.

TEMPERATURE CONTROLLERS

Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 LaSalle St., Chicago 10, Ill.
Leeds & Northrup, 444 North 16th St., Philadelphia 40, Pa.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

TESTING EQUIPMENT

American Cystoscope Makers Inc., 129 East 78th St., New York, N. Y.
Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

TESTING MACHINES (Tensile)

Harry Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

THERMOCOUPLES
Claude S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., Bergenfield, N. J.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

THREADING MACHINES
Cleveland Tapping Machine Co., Canton 6, Ohio.

TIMERS (Electric)
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

TONGS
Industrial Equipment Co., Minster, O.

TOOLS (Pneumatic Portable)
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Keller Tool Co., Grand Haven, Michigan.
Schramm Inc., West Chester, Pa.
Thor Power Tool Co., Aurora, Ill.

TORCHES and BURNERS (Acetylene, Gas, Oil)
Freeman Supply Co., 1152 East Broadway, Toledo, Ohio.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17.

TORCHES (Gouging & Cutting)
Arcair Co., P.O. Box 337, Lancaster, O. & P.O. Box 4107, Bremerton, Wash.

TOTE BOXES (see BOXES-TOTE)

TRACTOR (Industrial)
Baker-Raulang Co., 1250 West 80th St., Cleveland 2, Ohio.
Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Frank G. Hough Co., Libertyville, Ill.

TRAMRAIL SYSTEMS
American MonoRail Co., 13104 Athens Ave., Cleveland 7, Ohio.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Modern Equipment Co., Port Washington, Wis.

TROLLEYS
Curtis Pneumatic Machinery Div. Curtis Mfg. Co., 1905 Kienlen Ave., St. Louis 20, Mo.
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.
Modern Equipment Co., Port Washington, Wis.

TRUCK CRANES
Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.

TRUCK WHEELS
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TRUCKS (Casting)
Kwix-Mix Co., 3026 West Concordia, Milwaukee 16, Wis.
Prime Mover Co., Muscatine, Iowa.
Ready Power Co., 3826 Grand River Avenue, Detroit 8, Michigan.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TRUCKS (Core)
Ready Power Co., 3826 Grand River Avenue, Detroit 8, Michigan.

TRUCKS (Core Oven)
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

TRUCKS (Industrial)
Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.

TRUCKS (Power Lift)
Baker-Lull Corp., 314 West 90th St., Minneapolis 20, Minn.
Baker-Raulang Co., 1250 West 80th St., Cleveland 2, Ohio.
Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Frank G. Hough Co., Libertyville, Ill.
Hyster Company, Portland 8, Oregon.
Ready Power Co., 3826 Grand River Avenue, Detroit 8, Michigan.
Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.
Towmotor Corp., 1226 East 152nd St., Cleveland 10, Ohio.

TUBES (X-Ray)
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

TUMBLING BARRELS
Royersford Foundry & Machine Co., Royersford, Pa.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Newaygo Engineering Co., Newaygo, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNIT HEATERS (Electric)
Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

UNLOADERS (Car)
Brady Conveyors Corp., 20 West Jackson Blvd., Chicago 4, Ill.
Link Belt Company, 307 North Michigan Ave., Chicago 1, Ill.

UNLOADERS (Portable-Gas, Electric)
Barber-Green Co., Aurora, Ill.

VALVES (Air, Water, Steam)
Ross Operating Valve Co., 120 East Golden Gate, Detroit, Michigan.

VALVES (Blow-off and Cut-off)
Bellows Company, Akron 10, Ohio.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
C. B. Hunt & Sons Inc., Salem, Ohio.
Wm. H. Nicholls Co., Richmond Mill, Long Island 18, N. Y.
Ross Operating Valve Co., 120 East Golden Gate, Detroit, Michigan.

VALVES (Oxygen, Acetylene)
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

VENTILATING SYSTEMS
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Herman Nelson Division, American Air Filter Co., Inc., Louisville 8, Kentucky.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Pangborn Corp., Hagerstown, Md.
Robbins & Myers Inc., Propellair Div., Springfield, Ohio.
Schneible Co., Claude B., 212 Stephenson Bldg., P.O. Box 81, North End Station, Detroit 2, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, Ohio.

VENTS (Corebox)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1124 Woodward Hgts. Blvd., Ferndale 20, Mich.

VIBRATION REDUCTION PADS
Fabreeka Products, Inc., 222 Summer St., Boston 10, Mass.
New York Belting & Packing Co., 1 Market St., Passaic, N. J.

VIBRATORS
Adams Co., Dubuque, Iowa.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
The Branford Co., 131 Chestnut St., New Haven 7, Conn.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
Nicholls Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VISES (Hydraulic, Mechanical, etc.)
Desmond-Stephen Mfg. Co., Urbana, Ohio.

WASHES—See MOLD WASH and CORE WASH

WEDGES (Foundry)
The Adams Co., Dubuque, Iowa.
Hardy Sand Co., P. O. Box 476, Evansville, Indiana.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING APPARATUS (Electric arc)
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Arcair Co., P.O. Box 337, Lancaster, O. & P.O. Box 4107, Bremerton, Wash.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)
National Carbon Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., Saginaw, Mich.

WELDING GAS
Air Reduction Sales Co., 60 E. 42nd St., New York 17, N.Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Marquette Mfg. Co., 307 East Hennepin Ave., Minneapolis 13, Minn.

WETTING AGENTS
Aquadyne Corp., 441 Lexington Ave., New York 17, N. Y.
Pelron Corporation, 7740 West 47th St., Lyons, Ill.

WHEELBARROWS
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Abrasives Corp., Vars Bldg., Buffalo 2, N. Y.
Macklin Company, Jackson, Mich.
Norton Company, Worcester 6, Mass.
Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Abrasive Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire Brush)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

WIRE BENDERS
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

WIRE CUTTERS
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

WIRE NAILS
Republic Steel Corp., 3100 E. 70th St., Cleveland 4, Ohio.

WOODWORKING MACHINERY
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Cystoscope Makers Inc., 129 East 78th St., New York, N. Y.
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

X-RAY FILMS
Eastman Kodak Co., Rochester, N. Y.
General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14, Wis.

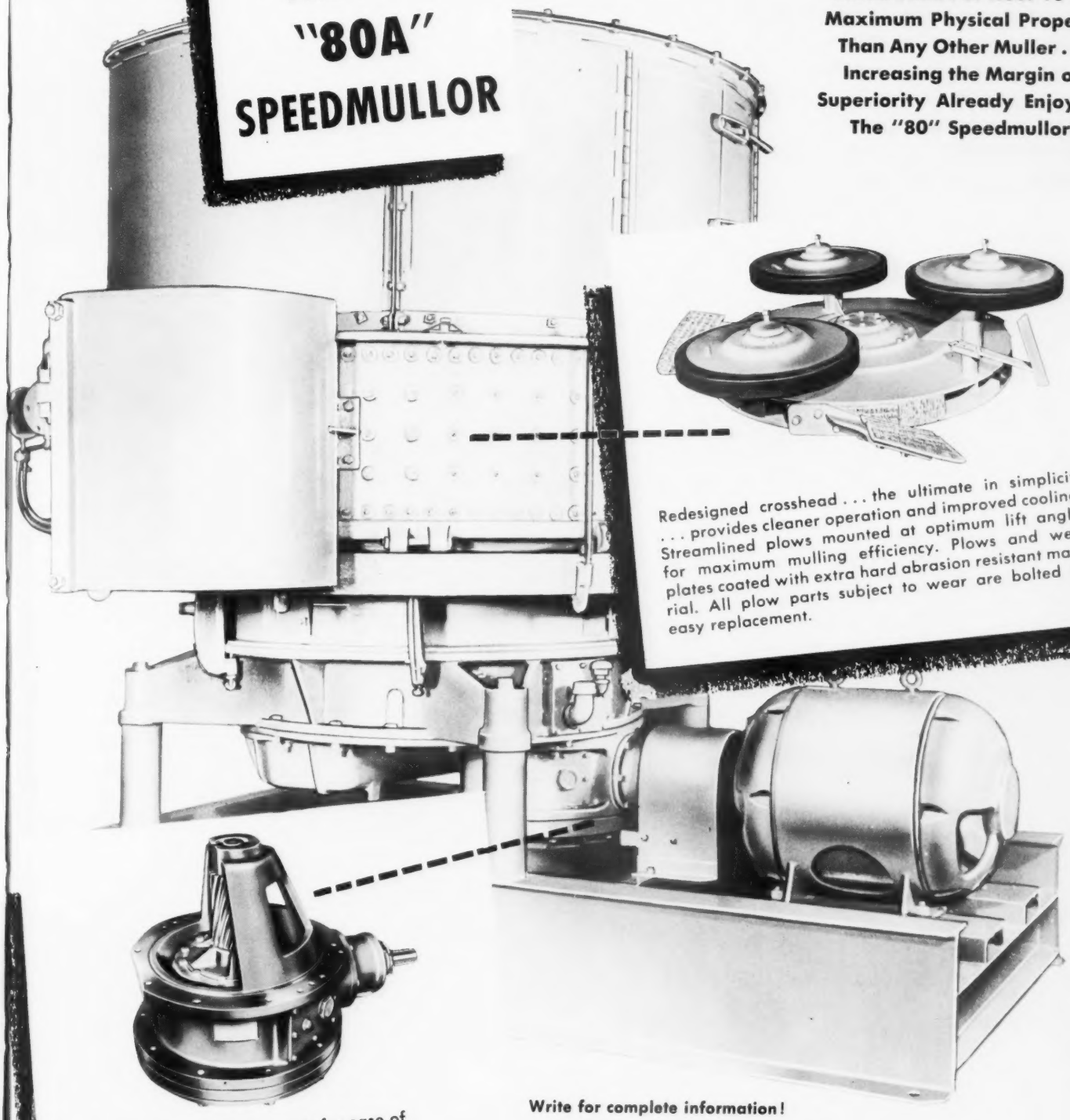
ZINC
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

ZIRCON SAND
Derby & Co., Inc., 551 Fifth Ave., New York 17, N. Y.
Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.

Greater hourly capacity than any other muller!

THE NEW "80A" SPEEDMULLOR

The New "80A" Speedmullor Mulls MORE Sand Per Hour To Its Maximum Physical Properties Than Any Other Muller . . . Increasing the Margin of Superiority Already Enjoyed By The "80" Speedmullor!



Redesigned crosshead . . . the ultimate in simplicity . . . provides cleaner operation and improved cooling! Streamlined plows mounted at optimum lift angles for maximum mulling efficiency. Plows and wear plates coated with extra hard abrasion resistant material. All plow parts subject to wear are bolted for easy replacement.

Removable transmission unit for ease of maintenance. Directed force-feed lubrication for longer drive unit life. Involute pump integral part of transmission.

Write for complete information!

BEARDSLEY & PIPER
Div. Pettibone Mulliken Corp.,
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Chicago 39, Illinois

B&P

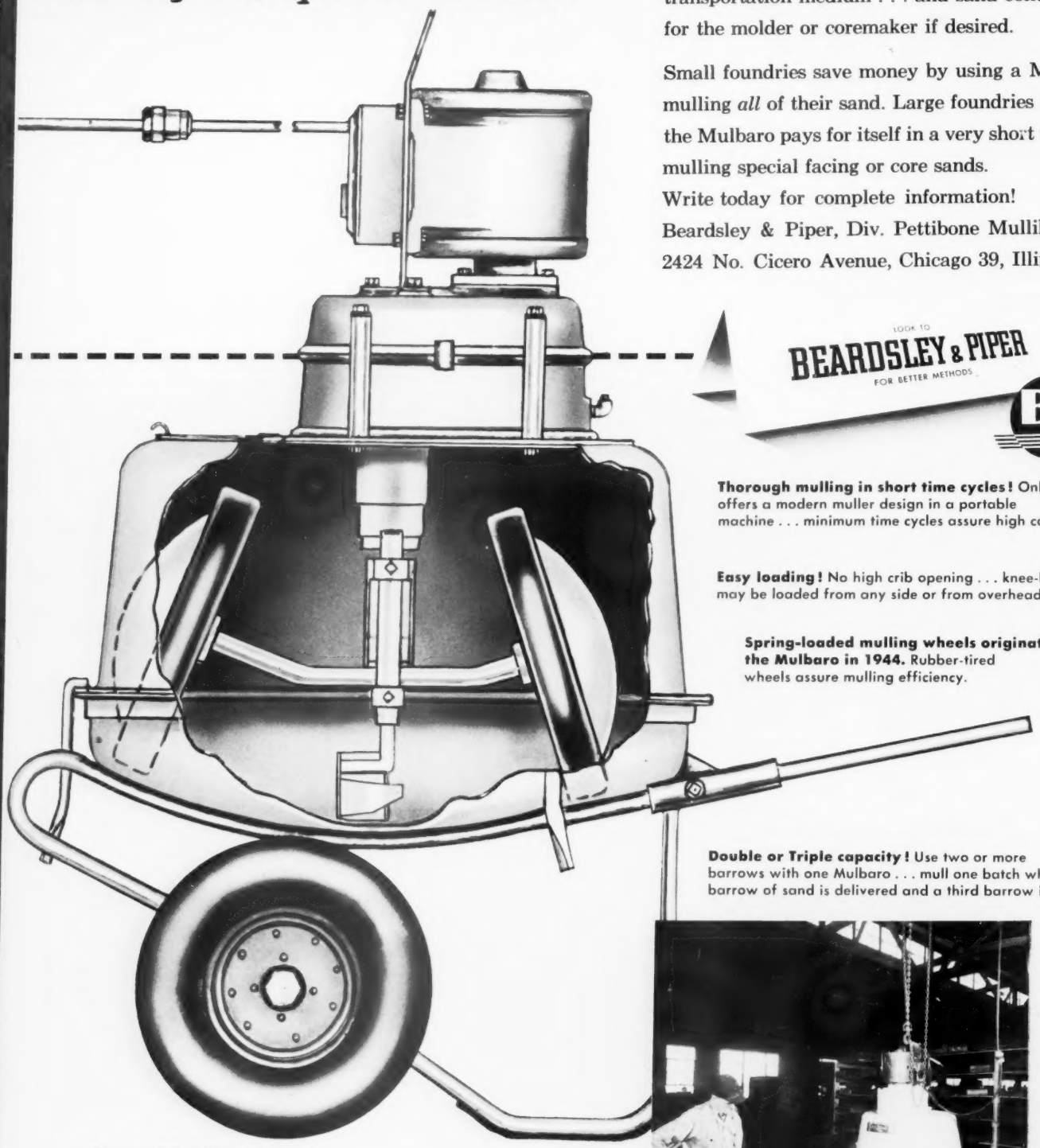
MEMBER FEMA

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

Here's why more foundries use

MULBAROS

than any other portable muller!



Once loaded, the Mulbaro's barrow is placed beneath the mulling mechanism which is then lowered into position. Mulling is completed in *four minutes* or less, and the sand is ready for delivery anywhere in the foundry. There's no time wasted in loading or unloading. The barrow serves not only as a mulling pan during the mulling cycle, but as the transportation medium . . . and sand container for the molder or coremaker if desired.

Small foundries save money by using a Mulbaro for mulling *all* of their sand. Large foundries find that the Mulbaro pays for itself in a very short time in mulling special facing or core sands.

Write today for complete information!

Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 No. Cicero Avenue, Chicago 39, Illinois.

LOOK TO **BEARDSLEY & PIPER** FOR BETTER METHODS

B&P

FEMA

Thorough mulling in short time cycles! Only the Mulbaro offers a modern muller design in a portable machine . . . minimum time cycles assure high capacity.

Easy loading! No high crib opening . . . knee-high barrows may be loaded from any side or from overhead hopper.

Spring-loaded mulling wheels originated with the Mulbaro in 1944. Rubber-tired wheels assure mulling efficiency.

Double or Triple capacity! Use two or more barrows with one Mulbaro . . . mull one batch while a second barrow of sand is delivered and a third barrow is loaded.

Less sand handling! Handle the sand **once** when it's loaded for mulling . . . then deliver it to molder or coremaker in the same barrow.

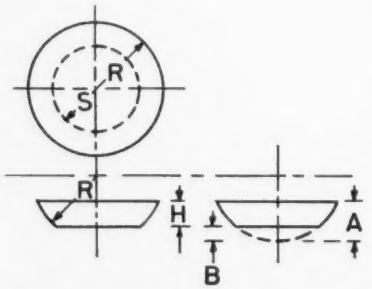
Really portable! Move the sand . . . not the whole machine.

Formulas for Determining Weights of Castings

(Concluded from February issue)

Formulas for Determining Weights of Castings

(Concluded from February issue)



To find the weight of a spherical segment of two bases, from the radius of the sphere multiplied by the difference between the squares of the distances from the bases to the pole, by the constant K, subtract the difference between the cubes of the distances from the bases to the pole multiplied by the constant C, obtained from Table XIX, or to the sum of the squares of the radii of the bases multiplied by the height by the value of m, add the height cubed multiplied by the value of c.

$$W = (A^2 - B^2)RK - (A^3 - B^3)C \text{ or } W = (r^2 + s^2)Hm + H^3c$$

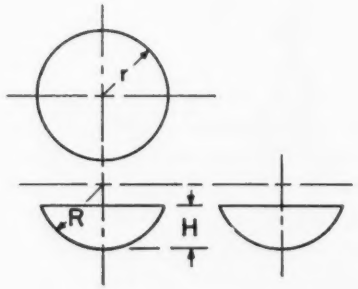
TABLE XIX

Wt. per cu. in.	K	m	c	Wt. per cu. in.	K	m	c	Wt. per cu. in.	K	m	c
.096	.3016	.1508	.0503	.250	.7854	.3927	.1309	.410	1.288	.6440	.2146
.100	.3142	.1571	.0524	.260	.8168	.4084	.1361	.420	1.319	.6528	.2199
.110	.3456	.1728	.0526	.270	.8482	.4241	.1414	.430	1.351	.6755	.2251
.120	.3770	.1885	.0628	.280	.8796	.4308	.1466	.440	1.382	.6912	.2303
.130	.4084	.2042	.0680	.290	.9111	.4556	.1518	.450	1.414	.7060	.2356
.140	.4398	.2199	.0732	.300	.9425	.4712	.1571	.460	1.445	.7226	.2408
.150	.4712	.2356	.0785	.310	.9739	.4870	.1623	.470	1.477	.7388	.2460
.160	.5027	.2514	.0838	.320	1.005	.5027	.1675	.480	1.508	.7540	.2513
.170	.5341	.2676	.0881	.330	1.037	.5184	.1728	.490	1.539	.7697	.2565
.180	.5655	.2828	.0943	.340	1.068	.5341	.1780	.500	1.571	.7854	.2617
.190	.5969	.2985	.0995	.350	1.100	.5498	.1832	.510	1.602	.8009	.2670
.200	.6283	.3142	.1047	.360	1.131	.5655	.1885	.520	1.634	.8168	.2722
.210	.6598	.3299	.1100	.370	1.162	.5811	.1937	.530	1.665	.8325	.2774
.220	.6912	.3456	.1152	.380	1.194	.5969	.1989	.540	1.696	.8482	.2827
.230	.7226	.3613	.1204	.390	1.225	.6126	.2042	.550	1.728	.8639	.2879
.240	.7540	.3770	.1257	.400	1.257	.6283	.2094	.560	1.759	.8796	.2931

Interpolation Table

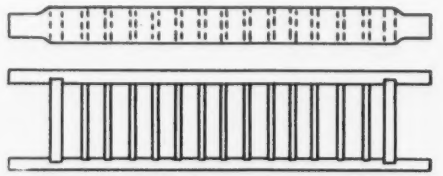
wt. Add'l	K Add'l	m Add'l	c Add'l	wt. Add'l	K Add'l	m Add'l	c Add'l	wt. Add'l	K Add'l	m Add'l	c Add'l
.001	.0031	.0016	.0005	.004	.0126	.0063	.0021	.007	.0220	.0110	.0037
.002	.0063	.0031	.0010	.005	.0157	.0079	.0026	.008	.0251	.0126	.0042
.003	.0094	.0047	.0015	.006	.0188	.0094	.0031	.009	.0283	.0142	.0049

For method of interpolation, see Table II, page 150, July 1953 issue.



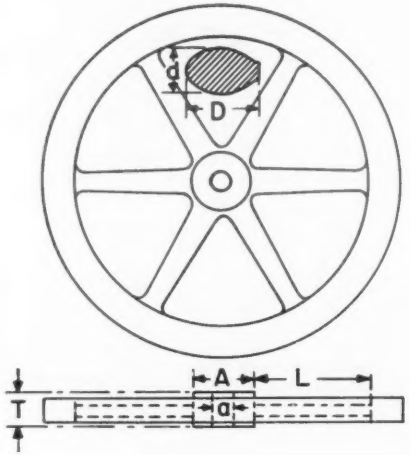
To find the weight of a spherical segment of one base, multiply the square of the height by the difference between the radius of the sphere and one-third of the height by the value of K corresponding to the weight per cubic inch of material used, or, to the radius of the base squared multiplied by the height, by the value of m, add the height cubed multiplied by the value of c (Table XIX).

$$W = \left(R - \frac{H}{3}\right)H^2k \text{ or } W = r^2Hm + H^3c$$



To find the weight of a body of sand where W = weight of body of sand in pounds; L = length of body of sand in feet; B = breadth of body of sand in feet, and H = height of body of sand in feet:

$$W = LBH \times 100$$



To find the weight of a flywheel with elliptical arms the first operation is to find the weight of the hub; second, that of the rim, and third, that of the arms. The sum of these weights gives the weight of the wheel. To find the weight of the hub:

$$W = (A^2 - a^2)T \times 0.817$$

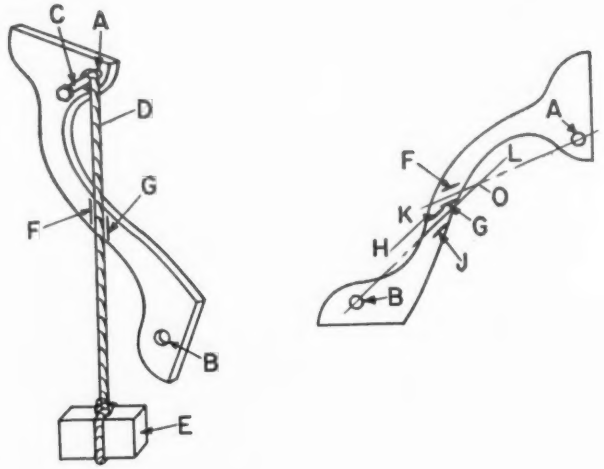
where W = weight of casting in lb; A = outside diameter of hub; a = inside diameter, and T = thickness of hub — all in inches.

To find the weight of the rim the same formula as above is used, substituting the inside and outside diameters of the rim.

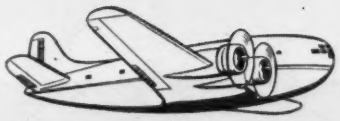
To find the weight of one arm where W = weight in lb; D = large dimension of the arm; d = small dimension, and L = length of the arm — all in inches:

$$W = DdL \times 0.204$$

Multiply by six to find the weight of the six arms.



To find the center of gravity of any irregular figure, first lay out the figure on stiff paper, then cut it out and punch two holes, A and B, the diameter of which should be larger than that of the pin, C, then hang the body on the pin C, at A, so that it can move freely. Then attach a cord D, with a weight, E, to C, in such a manner that they can also move freely. When the body, cord and weight have come to rest mark on the body the lines, F and G, along the sides of the cord. Then in the same manner, suspending the body at B, obtain the lines H and J, laying down the body on a piece of paper draw A-K, passing midway between F and G. Then draw B-L, and then the intersection of A-K and B-L, that is O, which is the center of gravity required.



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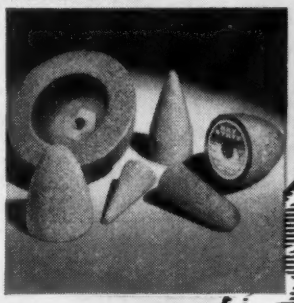
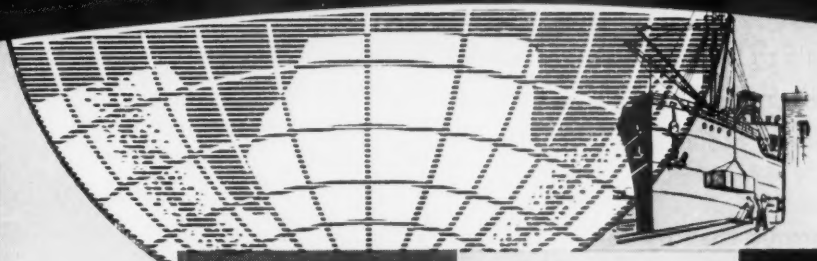
STRAIGHT SNAGGING WHEELS

BAY STATE ®

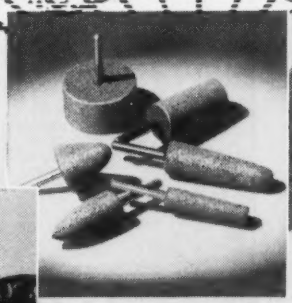
CUPS and CONES

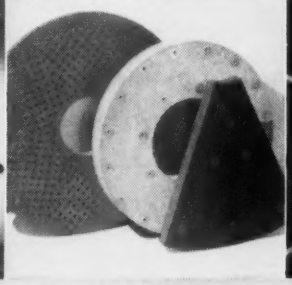


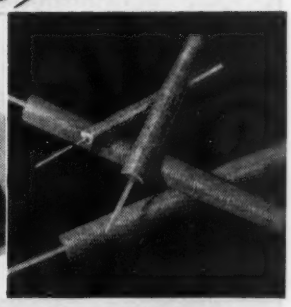
WHEELS of PROGRESS



CUT-OFF WHEELS







MOUNTED POINTS

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THE COMPLETE FOUNDRY LINE

For over 30 years world-wide users of abrasive products have recognized BAY STATE as a source of highest quality.

This reputation has been gained by the exacting work of its skilled craftsmen, exhaustive product testing and constant field research. Wheels of progress indeed!

BAY STATE WHEELS of PROGRESS

For maximum effectiveness of these "Wheels of Progress" in your foundry, BAY STATE offers "On-The-Job" Engineering Service. It brings experienced, abrasive-product specialists to any trouble-spot or low-efficiency operation in your cleaning room.

These men know grinding, and their services are yours for the asking. Write: Bay State Abrasive Products Co., Westboro, Massachusetts.

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IN CANADA: BAY STATE ABRASIVE PRODUCTS CO. (CANADA) LTD., BRANTFORD, ONT.

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SPEED *Prevents* WASTE

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Ajax-Northrup Induction Furnaces melt so fast there's no time for "burning-up" chromium, molybdenum, master alloys, and other easily oxidized materials.

One foundry, melting stainless steel, recovers 99% of the chromium charged... saves $60,000 a year in reduced losses of this single element.

A typical non-ferrous foundry reduced melting costs by over $33.00 a ton!

If you've got a tough melting problem where speed, accurate control, and low losses of expensive metals are important, we'd like to show you what induction melting can do for you. Just write or call us.

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INDUCTION HEATING AND MELTING

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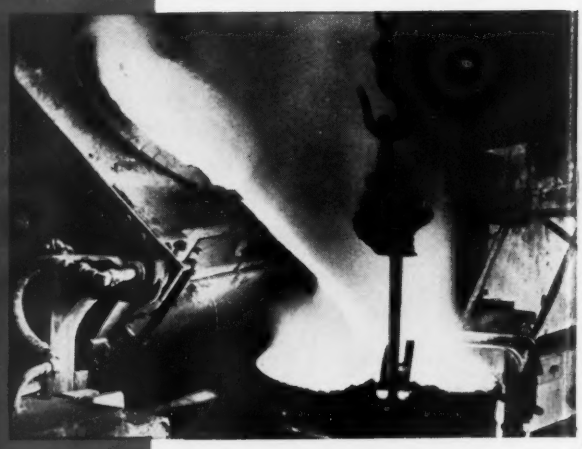
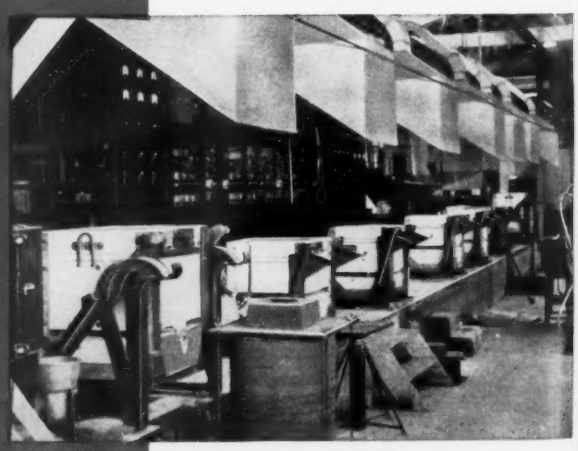


STEEL MELTING

NON-FERROUS MELTING



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Associated Companies

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AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

Industry Briefs

WATSON-PARK Co., Ballardvale, Mass., has merged completely with Reichhold Chemicals Inc., New York, and its plant hereafter will be headquarters of Reichhold's New England division. The two firms have been affiliated since 1952. The Ballardvale plant now produces resins and other chemicals, and its output soon will be expanded to include urea and phenolic adhesives for a number of fields, including the foundry industry.

* * *

Erie Steel Construction Co., Erie, Pa., has changed its name to Erie Strayer Co. because the old name no longer was indicative of its products. Whereas the company once fabricated structural steel for buildings, it now makes such equipment as clamshell and dragline buckets, batching equipment, bins and overhead electric cranes.

* * *

Tabor Mfg. Co., Philadelphia, has been sold to Jerome K. Jelin and Paul Bluestein, of Cincinnati. Officers of the new organization are: Jerome K. Jelin, chairman of the board; Paul H. Bluestein, president; William G. Dennis, vice president; Harry H. Wachtel, secretary; and Herbert D. Silver, treasurer. L. S. Lewis continues in charge of sales.

* * *

Parkersburg Rig & Reel Co., Parkersburg, W. Va., and Aetna Ball & Roller Bearing Co., Chicago, have merged and will be known as Parkersburg-Aetna Corp. Parkersburg Rig & Reel operates a foundry in Pomeroy, O.

* * *

Research Instrument Co., 12410 Triskett Rd., Cleveland, has been appointed sales representative of the Tinius Olsen Testing Machine Co., Willow Grove, Pa., for the state of Ohio, except several counties adjacent to the Pittsburgh area.

* * *

C. O. Bartlett & Snow Co., Cleveland, has concluded an agreement with Coleman-Wallwork Co. Ltd., London, under which Coleman-Wallwork will manufacture and sell car type mold conveyors built to Bartlett & Snow specifications. Coleman-Wallwork will have distribution rights in the sterling areas and in Asia and Africa. Coleman-Wallwork, an independent organization within a group of companies known as the J. Stone Group, specializes in the manufacture of equipment and machinery for foundries.

* * *

Metal Products Division, Koppers Co., Pittsburgh, will construct a new mechanical development laboratory devoted to the refinement and adaptation of present processes and products and to the development of new products. To be located at Koppers' South Baltimore plant, it will be staffed by more than 50 engineers, technicians, draftsmen, mechanics and machinists.

* * *

Investment Casting Co. has moved from Newark, N. J., to new quarters at 60 Brown Ave., Springfield, N. J., in order to attain larger and better facilities The new telephone number is Millburn 6-6260.

* * *

Sterling Abrasives Division of Cleveland Quarries Co., Tiffin, O., has opened a warehouse and sales office at 5801 Rising Sun Ave., Philadelphia, where a complete stock of grinding wheel and related abrasive items will be carried. John A. Baker, for 9 years representative in the Philadelphia area, has been named district manager of the new office, and Harold A. Skeen has been appointed sales engineer.

* * *

Westside Foundry Co., 1501 North Third St., Kansas City, Kans., suffered an estimated $10,000 loss from fire on Jan. 15. It is believed that sparks from pouring operations lodged in beams supporting the roof and smoldered there until they burst into flame.

* * *

Society of Industrial Packaging and Materials Handling Engineers has moved from 20 West Jackson Blvd., Chicago, to Suite 611, 111 West Jackson Blvd., Chicago 4. Telephone numbers are unchanged.

* * *

Acetogen Cutting Gas Co. has been formed by Robert D. Fier and Herbert A. Frankel, with offices at 26 Court St., Brooklyn 1, N. Y. Mr. Fier was recently associated with Standard Oil Development Co. and Mr. Frankel with Foundry Services Inc., New York.

* * *

Detroit Controls Corp., division of American Radiator & Standard Sanitary Corp., has bought Belknap Mfg. Co., Bridgeport, Conn., 92-year-old producer of bronze valves, fittings and specialized castings.

* * *

Rapids-Standard Co., Grand Rapids, Mich., has purchased an interest in Keystone Conveyor Co., Detroit, manufacturer of endless chain conveyors. New name of the firm is Rapistan-

ALL-ALUMINUM FOUNDRY BUILDING: Grafton Foundry Co., 777 Barchard St., Grafton, O., is an aluminum foundry in more ways than one. Not only does the firm produce up to 20 tons per month of aluminum castings weighing up to 1500 lb, but its new 50 x 100 ft building is aluminum, too. The firm pours magnesium as well as all the aluminum alloys. It moved from 797 Barchard St. to the new structure in Dec., 1953. Walter O. Larson Jr. and Sr. are president and vice president, respectively

Keystone Inc. The management and sales organization will not be changed, except for the addition of Nathan C. Snyder as secretary and Eugene Hummel as treasurer.

* * *

T. A. Reilly Co., 139 North Clark St., Chicago, has been appointed to represent Acme Abrasive Co., Center Line, Mich., manufacturer of grinding wheels, in northern Indiana and Illinois.

* * *

Efco-Lindberg Ltd., 544 Inspector St., Montreal, Quebec, has been formed in Montreal, with branches throughout Canada, to combine the resources of Lindberg Engineering Co., Chicago, Electric Furnace Co., England, and Williams & Wilson Ltd., Canada. It will manufacture a complete line of heat treating and melting furnaces.

* * *

Babcock & Wilcox Co., New York, and Seaboard Refractories Co., Raritan Township, N. J., have concluded an agreement under which all of Seaboard's manufacturing facilities will be devoted to production of special refractories for Babcock & Wilcox. Sales will be handled by B & W.

Aluminum Association Elects Officers

At the annual meeting of the Aluminum Association, held recently in New York, D. A. Rhoades, Kaiser Aluminum & Chemical Corp., Oakland, Calif., was re-elected president. A. V. Davis, Aluminum Co. of America, New York, was re-elected chairman of the board, and Donald M. White, was reappointed secretary and treasurer. Vice presidents elected include S. D. Den Uyl, Bohn Aluminum & Brass Corp., Detroit; Raymond Deutsch, Monarch Aluminum Mfg. Co., Cleveland; and R. P. Stranahan, Stranahan Foil Co., South Hackensack, N. J.

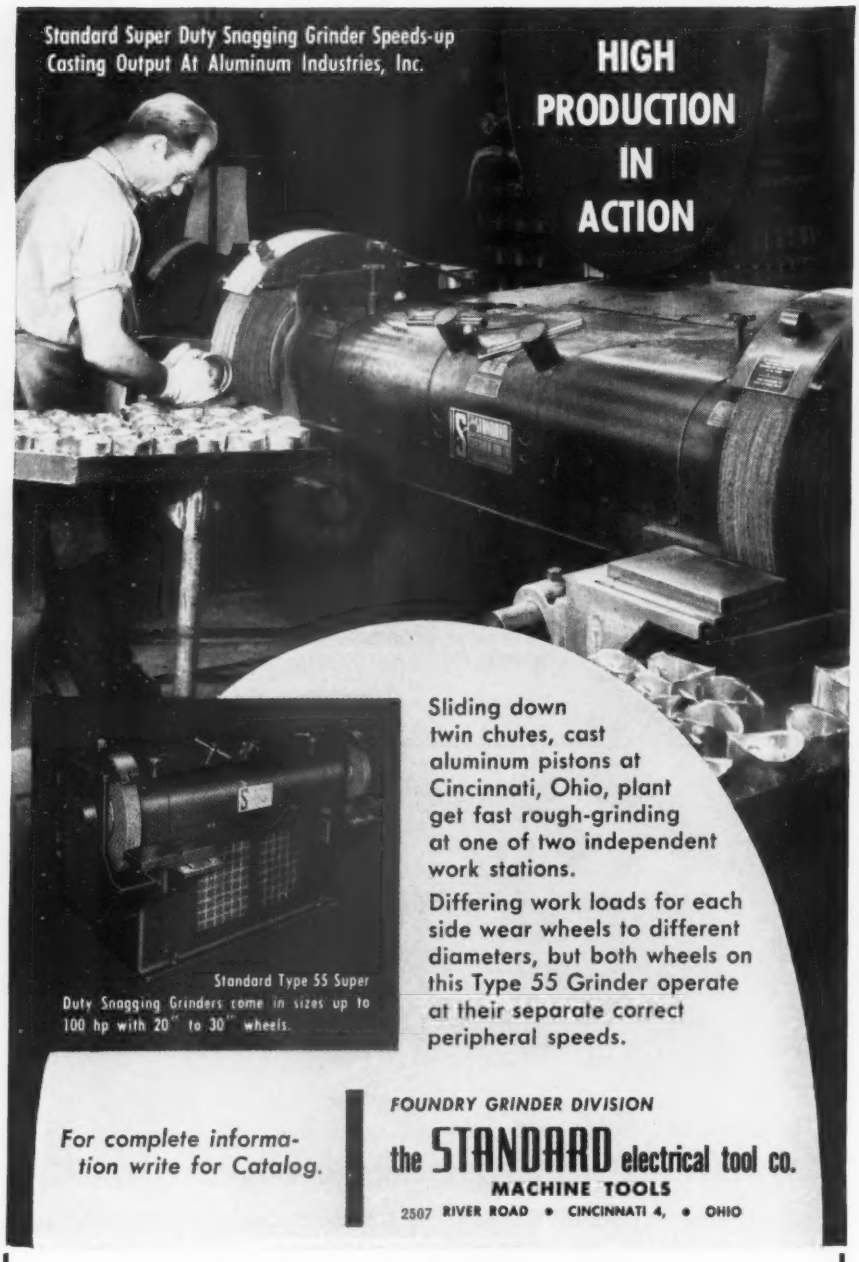
In the Foundry Division, Richard G. Tessendorf, Aluminum Industries Inc., Cincinnati, was elected chairman, and J. Frank Seeley, Bohn Aluminum & Brass Corp., Detroit, vice chairman. E. G. Fahlman, the Permold Co., Medina, O., was designated to represent the division on the board of directors, and D. M. White was renamed treasurer.

Four companies were elected to association membership during the meeting. New members are Anaconda Aluminum Co., New York; Magnesium Co. of America, East Chicago, Ind.; Sonken - Galamba Corp., Kansas City, Kans.; and R. D. Werner Co., Greenville, Pa.

Sound-Color Film Shows Ultrasonic Inspection

A ten-minute, sound-color educational film describing the development, theory and application of an ultrasonic device for nondestructive testing of metals and other materials has been released by Sperry Products Inc., Danbury, Conn., manufacturer of the product. Called "Ultrasonic Inspection," the film shows latest techniques in ultrasonic testing of raw stock, finished parts and plant equipment.

In addition, the film describes recent developments in immersion testing, an advanced method of quality control on a production basis which involves ultrasonic inspection and automatic recording of results. Prints are available for showings to interested industry, trade and technical groups as well as to technical and engineering societies, schools and colleges.


Standard Super Duty Snagging Grinder Speeds-up Casting Output At Aluminum Industries, Inc.
HIGH PRODUCTION IN ACTION
Standard Type 55 Super Duty Snagging Grinders come in sizes up to 100 hp with 20" to 30" wheels.
Sliding down twin chutes, cast aluminum pistons at Cincinnati, Ohio, plant get fast rough-grinding at one of two independent work stations.
Differing work loads for each side wear wheels to different diameters, but both wheels on this Type 55 Grinder operate at their separate correct peripheral speeds.
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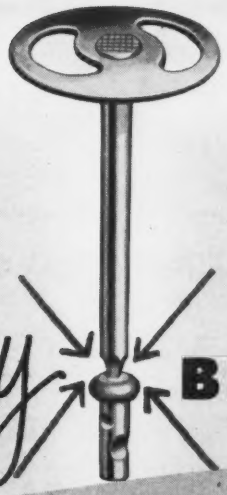

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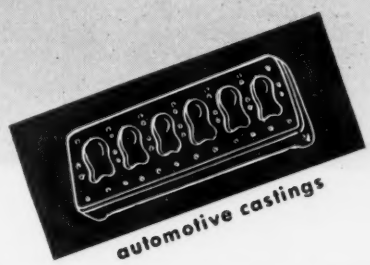
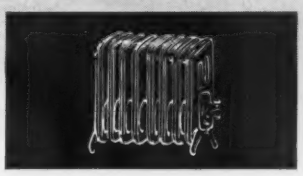
saves *time* and *money*...improves castings

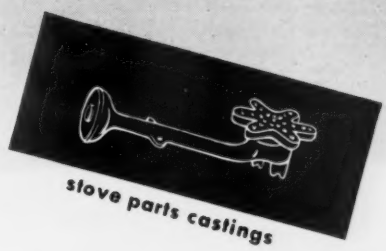
IDEALLY SUITABLE FOR



automotive castings



radiator castings

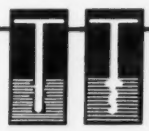


stove parts castings

EXCLUSIVE *New* 4-WAY BREAKOFF NICK

Provides maximum support during pouring, yet stem breaks off easily in any direction so that few remaining after shake-out can be easily brushed off with no apparent surface marks remaining.

STAGGERED KNITTING NICKS



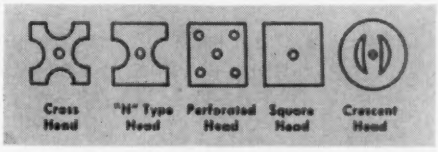
Provide better type of surface for knitting with molten metal, assuring thorough fusion and resulting in clean, solid castings.

A small change in design can often result in large savings in production. The new 4-way breakoff nick on fine FANNER Shoulder Radiator Chaplets is a typical example of the constant study given to casting methods by FANNER engineers. This small but highly important feature, in addition to the other exclusive advantages offered by FANNER Radiator Chaplets, speeds the production of clean, sound castings...help cut labor costs.

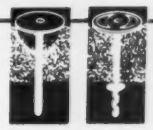
Fine FANNER Radiator Chaplets are especially suitable for light pressure castings such as gas burners, radiator sections and manifolds. Designed for use with the side of largest bearing area against green sand, they will support approximately 5 pounds per square inch load.

Get complete information on fine FANNER chaplets for all requirements by writing for FANNER Chaplet catalog today!

OTHER TYPES OF FINE FANNER SHOULDER RADIATOR CHAPLETS



NO HAND TUCKING



The special FANNER "open head" eliminates need for hand "tucking" and permits jolt and squeezer machines to pack sand solidly (as shown) along *entire* stem.

STURDY SHOULDER AND SOLID RIVETED HEAD

Shoulder is designed and placed to permit chaplet to be set into pattern required distance without guesswork. Solid riveted head exactly at right angles to stem to insure that chaplet is always perfectly "true".

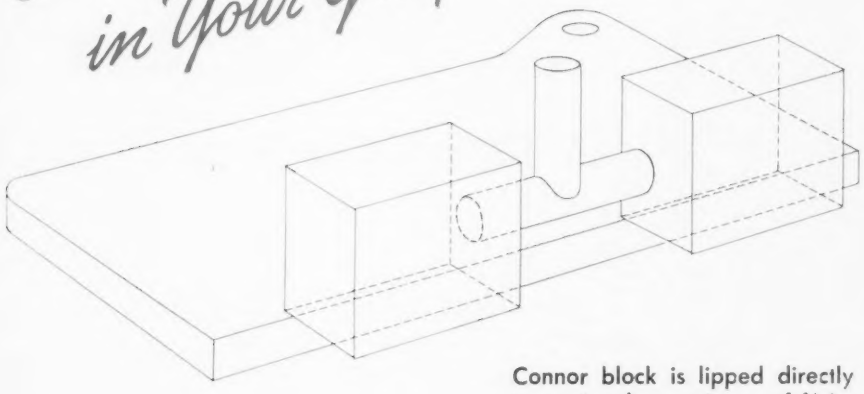
THE FANNER MANUFACTURING CO.

Designers and Manufacturers of Fine Fanner Chaplets and Chills

BROOKSIDE PARK CLEVELAND 9, OHIO

Can You Control Leakers in Your Gray Iron Castings?

By BRUNO F. DARIN
Development Engineer
Airojet-General Corp.
Azusa, Calif.



Connor block is lipped directly to casting by maximum of ⅛-in.

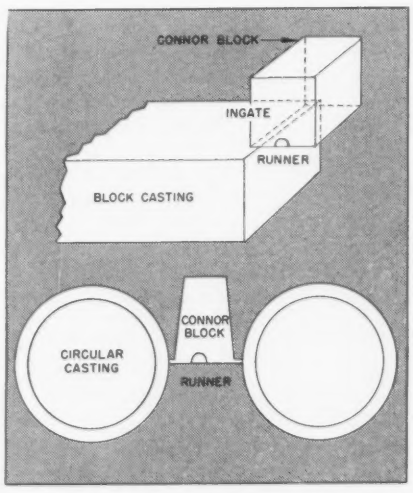
ONE of the most critical problems faced by many gray iron foundries is leakers. The problem is not new nor is it limited to any one foundry. It is surprising to learn that automotive foundry personnnel experience the same difficulty and, when they let their hair down, most of them agree pretty well on the percentage of leakers obtained.

Some managers claim they have solved this problem by changing the bond in the sand; others have eliminated the trouble by changing the quality of the cupola coke. Iron temperatures, carbon equivalents, controlled humidity of cupola blast —all have their pros and cons in arguments. No foundryman will attempt to minimize the importance of any one of these factors, but it seems to the writer that if we honestly appraise the results in percentage of leaker reduction obtained by placing one or all of these controls in effect, the results would be low.

Perhaps the problem is complicated in that it results from an accumulation of smaller problems which, individually, seem insignificant. Quality control is doing a great job in pointing out what combination of factors leads to the leaker problems. This develops into constant production versus quality control arguments and, in the best of foundries, results in costly policing of each minute factor.

Have we explored all other possibilities? Isn't there a buffer which, if properly applied, will nullify a great number of these small problems and result in an over-all reduction of leakers—not something that works under a definite set of controls until a new factor or a reshuffle of the old ones appears, but something that works for a longer span of time? The writer believes that an answer to this is in the use of the gating system originated by F. J. Connor, J. & E. Hall Ltd., Dartford, England. The Connor gate has proved successful in eliminating porosity and shrinks in flywheels, gear blanks, transmission housings, motor heads, water pumps, exhaust pipes, and a host of other castings.

The Connor gate probably has all the good features of a blind riser, pressure head, dirt trap, and Washburn riser. It equalizes speed of runners by having a definite pressure head during the entire time of pouring and filling of the mold cavity. It eliminates problems arising from erratic pouring. It fills the mold quickly and with the least amount of turbulence. Actual cut-away molds show no metal turbulence or "fingering" of metal as it covers the bottom of the mold. By eliminating risers and heavy ingates, it eliminates hot spots and results in even shrinkage of metal across the entire top area of a casting. No localized shrinkage is noted on bosses or heavy sections.



For circular castings, bottom, block does not overlap casting as at top but is inclined away from castings to avoid burn-in

The costly operation of removing risers and grinding ingates is all but eliminated. This is done to such an extent that it creates a minor problem if a foundry is using the old method of removing multiple castings from a flask at the shakeout by forking the downsprue. Ingates and downsprue actually break away from the casting during the solidification cycle long before the mold reaches the shakeout. The break is so close to the casting that in most cases no gate grinding is necessary before shipment to the machine shop.

The Connor gate is not a foundry curiosity nor is it adaptable only in certain cases. In Europe, England and the United States it has proved its worth on the production line. As an example, in one instance it decreased leakers in heads from 15 per cent to 3 per cent. Of course, good foundry practice has to be observed, with one added precaution—you can't have sloppy flask pins, although a maximum play of 0.010-in. is allowable.

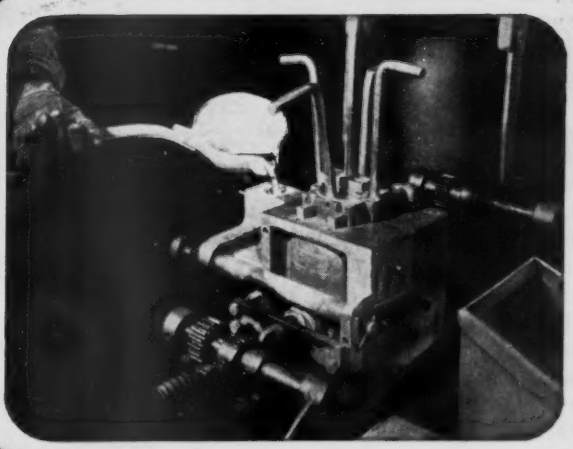
The entire secret of the Connor gate is in the amount of overlap or ingate depth on the casting. Referring to the accompanying sketch of a simple casting, a motor head, (Fig. 1), note that the Connor block is lipped directly onto the casting by a maximum of ⅛-in. If you have perfect flasks and pins, a 1/16-in. overlap is better; but for most production casting ⅛-in. gives less trouble with the least tendency to choke off the ingate. The block in this particular case is 2 x 3 x 2 in. and contacts the casting along its entire 3-in. side.

There seems to be little effect caused by the location of the runner

(*Concluded on page* 216)

telling the story of 'dag' dispersions

Here is a Better Parting Compound ...No Smoke at Any Temperature



It's a 'dag' dispersion... a material that's first of all a friction-fighting, heat-beating mold wash. Spray it on, paint it on, apply it by dipping. Molds, patterns, chills, cores... even push pins, shoulder screws, flask pins, and ladle interiors... they'll all take on a microscopically thin, slippery, *dry film,* that will banish sticking for good.

Try 'dag' dispersions. Parting will be quicker, castings will be smoother, than with any other parting agent. Binding and stripping will be eliminated. Chills will tap off easily without damage to casting surfaces.

As an added benefit, water dispersions of 'dag' Colloidal Graphite get rid of the irritating smoke caused by most parting compounds.

You can learn more about 'dag' parting compounds by asking for Bulletin No. 435-C3.

Dispersions of molybdenum disulfide are available in various carriers.

We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

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Acheson Colloids Company, Port Huron, Mich.

...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

try resin-bonded dry graphite films for permanent lubrication

(*Concluded from page* 214)

in the block. Some castings are made with the downsprue coming in directly over the block. In multiple-casting molds, the block can be used to advantage by bridging it across two castings, thereby providing the ingate for both with one block.

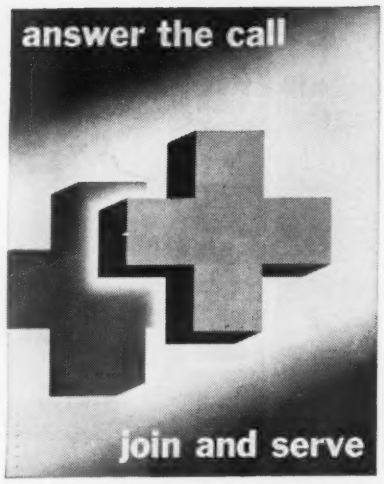
In the case of overdrive sleeves with a circular cross section, the overlap technique does not apply; however, by employing a slight variation of the same block, as illustrated in the line sketch in Fig. 2, excellent results were obtained. Here we note that the block is sloped away from the casting sufficiently to safeguard against burn-in. The ingate was 3/32 x 3 in. and the block was 1½ x 3 in. on the top face, 2 x 3 in. on the bottom face and 2½ in. high. Severe shrinkage problems on the mounting pad were eliminated by using this modified Connor gate.

It is not necessary to scrap a foundry's entire gating system. If your downsprue-runner-ingate area is already based on a 1.15:1.05:1.0 ratio, or any similar ratio that works in your foundry, adapt it with the Connor block. Thus, instead of having a semicircular .485-in.-radius ingate (.375 sq in. area), your Connor ingate would be ⅛ in. x 3 in., or .375 sq in. area. This, by the way, is a good basis to start from in adapting the Connor gate technique to your particular foundry.

Block Higher Than Casting

It is possible that you may have to change slightly from your present ingate location. You will find, for instance, that the Connor gate works better if its position is 180° from a heavy boss; or, in the case of a wheel with spokes, don't feed directly into the spokes but place the ingate halfway between them. This eliminates hot spots caused by the arms. The only place that a hot spot does any good in a casting is at the ingate and that is precisely where the Connor gate has it and it is used to good advantage by keeping the ingate open.

You must also remember that this gate does not feed uphill. This means that the top of the block must be higher than the uppermost level of the casting to be poured. Don't be afraid to attempt a Connor ingate on a contoured casting. Contour your block to conform to the casting. The thing to remember here is that, regardless of the size or casting weight, don't overlap more than ⅛-in. or the whole effect will be ruined. Don't use large blocks. If you need more ingate



area than 3½ x ⅛ in. provides, use multiple blocks correctly spaced around the casting. A 170-lb, six-spoked, 20-in.-diam wheel can be poured with only three equally spaced blocks covering one-third the circumference, or about 10 in. apart. The blocks would be 2½ x 1½ x 2½ in. in size, or a total ingate area of 0.94 sq in.

There are many uses for the Connor gate that have not been brought out here. The ingenuity of the American foundryman is limitless and, once told about the good features of the Connor gate, he will adapt it to his foundry with surprising speed . . . . if it makes money.

Book Review

Dictionnaire Technique Anglais-Francais Chauffage Industriel, by I. Dusnickis with the collaboration of P. Chaumelle, paper, 143 pages, 5¼ x 8⅜ in., published by Dunod, 92 Rue Bonaparte, Paris 6, France. Price 750 F.

This English-French dictionary, said to contain over 5000 terms relating to industrial heating, is designed for both the technician and the translator. It is divided into six sections pertaining to various phases of the field.

ANNUAL FEF CONFERENCE THEME

To Be Utilization of Engineering Talent

THE seventh annual college-industry conference of the Foundry Educational Foundation will be held Mar. 10-11 at Hotel Cleveland, Cleveland. Following up the theme of the conference last year, this meeting will emphasize how engineering talent can be and is being recruited, trained and used in the cast metals industry. In the interest of covering a wide range of situations and hearing from a maximum number of experts, two panels will cover the subject.

One day will be devoted to university people, who will describe the latest developments in course material, laboratories and instructional techniques. This session will be followed by the annual meeting of the FEF. The conference program, listed below, has been designed specifically to provide industry representatives with information which will be of practical value in plant operations. Special attention will be given to medium and small sized foundries.

Highlight of the conference will be the dinner session on the evening of the first day, at which the featured speaker will be Dr. John T. Rettaliata, president, Illinois Institute of Technology. Before he began his association with IIT in 1945, Dr. Rettaliata was a faculty member at the Baltimore College Center and held responsible positions with Allis-Chalmers Mfg. Co., Milwaukee. Chairman of the dinner meeting will be Thomas Kaveny Jr., president, Herman Pneumatic Machine Co., Pittsburgh, who is vice president of the FEF. Details of the program follow:

9:30 a.m., Wednesday, Mar. 10

Chairman—E. J. Walsh, executive director, Foundry Educational Foundation.

Welcome—J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, and president, Foundry Educational Foundation.

Report on the Foundry Industry—William G. Gude, managing editor, FOUNDRY.

University Activity: Northwestern University, University of Alabama, Cornell University, Pennsylvania State University.

1 p.m., Wednesday, Mar. 10

Chairman—E. J. Walsh.

University Activity: Missouri School of Mines, University of Wisconsin, University of Cincinnati, University of Michigan, Michigan State College, Case Institute of Technology.

4 p.m., Wednesday, Mar. 10

Annual Meeting: Foundry Educational Foundation, J. T. MacKenzie, presiding.

9:30 a.m., Thursday, Mar. 11

Chairman — George K. Dreher, Waukesha Foundry Co., Waukesha, Wis.

An Educational Program at the Secondary and Vocational School Level—Ashley B. Sinnett, Michigan State College.

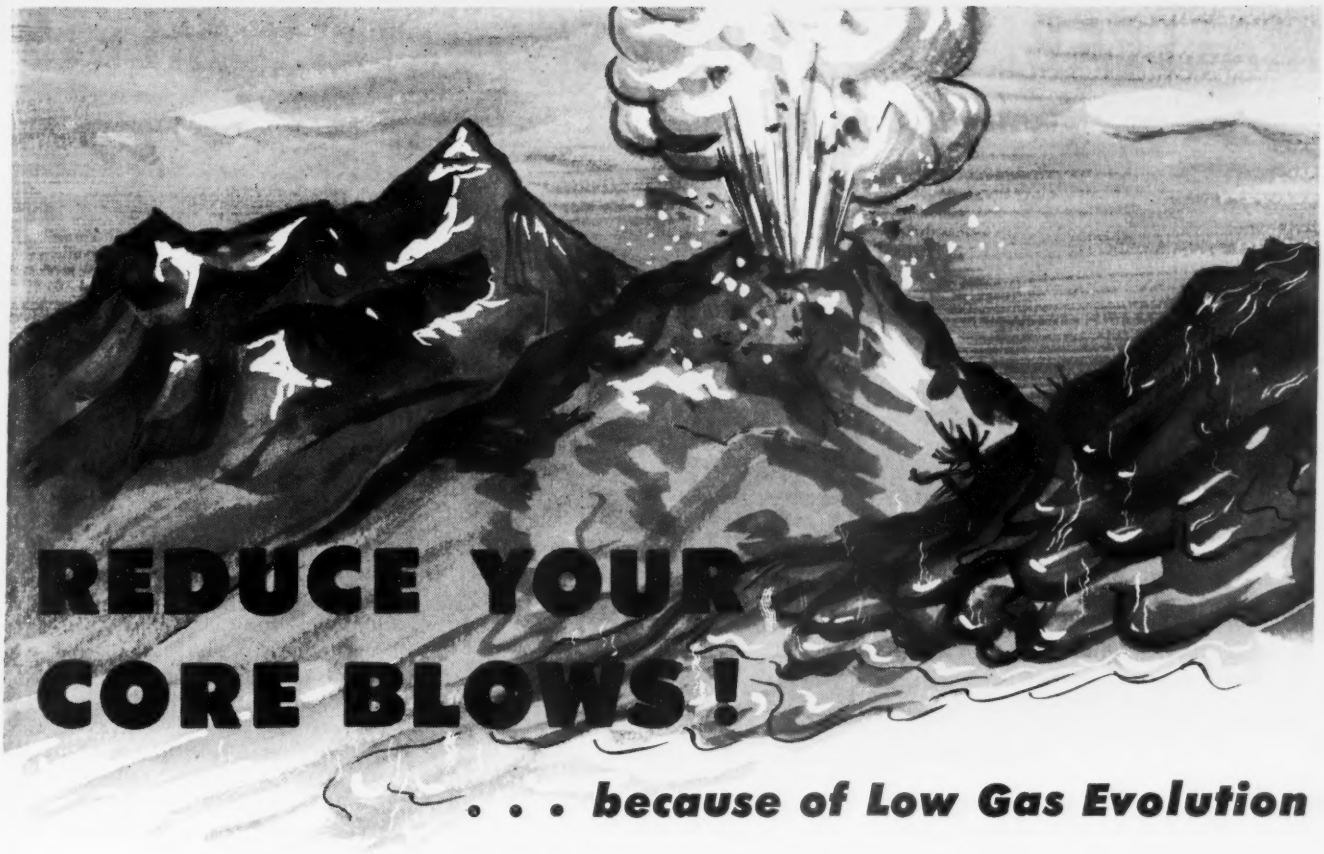
Panel—**Recruiting for the Foundry Industry.** Moderator—Prof. P. E. Kyle, Cornell University. E. C. Kubicek, director of placement, Illinois Institute of Technology; Arthur Bach, placement director, Case Institute of Technology; A. L. Hunt, manager of industrial sales, National Bearings Division, American Brake Shoe Co.; A. C. Hensel, personnel relations division, Albion Malleable Iron Co.

1 p.m., Thursday, Mar. 11

Chairman—George K. Dreher.

Panel—**Absorption and Utilization of Engineering Talent in the Foundry Industry.** Moderator—R. V. Righter, plant manager, Central Foundry Division, General Motors Corp., Danville, Ill. E. W. Horlebein, president, Gibson & Kirk Co.; A. E. Rhoads, president, Engineering Castings Inc.; W. J. Hebard, personnel director, Continental Foundry & Machine Co.; Charles F. Seelbach Jr., plant manager, Forest City Foundries Co.

Conference Summary and Recommendations—Prof. Howard F. Taylor, Massachusetts Institute of Technology.



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KORE-SET Synthetic Core Resin

will make it possible for you to reduce your core blows substantially. You can use a finer sand for better finishes because of less gas generated. You can reduce your permeability without danger of blows.

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KORE-SET gives hard, smooth cores, eliminates 80% of the rods, and bakes out in less time. It has no odor, generates no unpleasant fumes, and works clean in the core boxes. There are no dermatitis problems when you use KORE-SET.

USE THIS COUPON FOR FREE SAMPLE

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Please ship us gratis a working sample of Kore-Set with instructions on its use.

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MALLEABLE FOUNDERS' SOCIETY MEETS

At National Malleable's Cleveland Works

CLEVELAND Works of National Malleable & Steel Castings Co. was host to the Malleable Founders' Society at the latter's general meeting, Jan. 22. The opportunity to inspect the plant's modern and extensive facilities for the production of malleable iron castings helped to draw a large attendance from the society's membership to this semi-annual gathering.

Attracting considerable interest during the morning's plant tour was the company's Technical Center. This unit, housed in a separate building adjoining the main plant, is devoted to engineering and research in cast products. It was formally opened last fall. Various of the Center's facilities were described in FOUNDRY, December, 1953, p. 152.

Following luncheon at the plant the afternoon was given over to a business session. Society President George T. Boli, president, Northern Malleable Iron Co., St. Paul, presided. Expressions of welcome to the group were voiced by Cleve H. Pomeroy, National Malleable president, and Wilson H. Moriarty, sales vice president.

It was announced that revisions of the society's handbook shortly will be under way. It is being handled by a committee headed by H. E. Steinhoff, vice president, Wagner Malleable Iron Co., Decatur, Ill.

Lawrence Kaelin, right, shown receiving the society's first-place award in its safety contest from G. T. Boli, president

Three of the four prize winners in the society's recent contest for the best papers prepared on safety subjects were present to receive their award checks from President Boli. Winners were: Lawrence Kaelin, National Malleable & Steel Castings Co., Indianapolis, first place; Leonard Bartosz, National Malleable & Steel Castings Co., Cicero, Ill., second place; William B. Sobers, Chain Belt Co., Milwaukee, third place; James Weigand, Marion Malleable Iron Works, Marion, Ind., fourth place. The winners' papers were published in FOUNDRY for February.

In plant safety competition, Richmond Malleable Castings Co., Richmond, Ind., was announced as having established the best record among society members in 1953. It had no lost-time accidents and will receive a suitable certificate.

In reporting on activities of the Market Development Committee, T. A. Scanlan Jr., Eastern Malleable Iron Co., called attention to the fifth Market Development Conference the society will sponsor on Apr. 8-9. It will be held in co-operation with Carnegie Institute of Technology at Webster Hall Hotel, Pittsburgh.

(*Concluded on page* 221)

Photos by National Malleable & Steel Castings Co.

Test demonstrations at the Technical Center of National Malleable & Steel Castings Co., Cleveland, drew an interested audience from the large number of foundrymen who attended a meeting of the Malleable Founders' Society there, Jan. 22. A tour of the plant featured the day's program

It's easy to fit
core formulations
to casting conditions with
FOUNDREZ 7600

Using RCI's liquid, water-soluble, thermosetting, urea-formaldehyde resin — FOUNDREZ 7600 — as a sand binder, you can easily develop the core mix that's best and most economical for your casting metal, oven capacity and production rate.

FOUNDREZ 7600 is flexible. It permits variation of such properties as green strength, collapsibility, permeability and hardness in a wide range of core formulations for copper, brass, bronze, aluminum, magnesium, gray iron, cast iron and steel alloy castings. Moreover, this stable resin speeds baking, an advantage you can use either for faster production or fuel savings.

For full data at no obligation, write for Technical Bulletin F-2. RCI's Foundry Technical Service is available to help create the mix most suited to your purpose.

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Creative Chemistry ...
Your Partner
in Progress

Synthetic Resins
Chemical Colors
Phenol
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Cleaned in 3 minutes

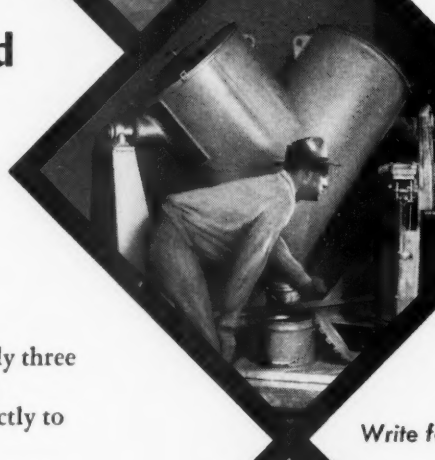
Blended in 3 minutes

vs 45 minutes by previous method

More thorough blending in *one-fifteenth* the time has been the experience of one manufacturer of hard-to-blend finely divided powders, assuring a completely thorough blend in three minutes that formerly required as much as 45 minutes to one hour and without any assurance of thoroughness. One blender replaces former methods which required a separate drum for every mix.

Now, clinical cleaning between batches is completed in only three minutes thanks to the baffle-free shell and the large charging openings. Discharge is also fast, with powders delivered directly to shipping containers on a scale platform.

In your own process work there is a place where **p-k** twin shell blenders can revolutionize your blending procedures. **p-k** maintains a blending laboratory where your blending problem can be pre-tested. Send a sample of your materials for a complete blending analysis, without obligation.



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(*Concluded from page* 218)

James H. Lansing, technical and research director, touched on recent technical developments, including work on low-temperature properties of malleable iron. He indicated that pearlitic malleable iron applications and adaptation of malleable castings to military parts are attracting more attention. Progress was reported on the society's gating and feeding research project.

The meeting was concluded with a poll of member foundry representatives concerning current and prospective operations. This disclosed that the large majority of foundries expected first quarter production to equal or exceed fourth quarter output. Only about 10 per cent of the foundries look for a decline this quarter.

Three Foundry Companies Win Management Awards

Three companies in the foundry field have been certified by the American Institute of Management, New York, as excellently managed. They are American Brake Shoe Co., New York; Lynchburg Foundry Co., Lynchburg, Va., and United Engineering & Foundry Co., Pittsburgh. Lynchburg Foundry received the award for the first time, the others for the fourth.

Of 3000 American and Canadian concerns studied by the institute, which is a nonprofit foundation, only 348 were found eligible to receive the designation in 1953. The philosophy behind the awards is to focus attention upon those companies with practices which should be emulated by others in order to increase efficiency and insure stability for employees, shareholders and the economy as a whole. A full list of the 348 award winning concerns is being published in the foundation's "Manual of Excellent Managements," copies of which are available from the institute, at 125 East 38th St., New York.

Book Review

Breve Storia Della Fonderia (Brief History of the Foundry), by Dr. Chim. Guglielmo Somigli, paper, 85 pages, 6 x 8½ in., published by the Italian Foundry Center of the Italian Metallurgical Association. Price 1000 lire.

In keeping with its title, this work is a brief history of the art of founding. It traces the evolution of the art from its prehistoric origins through the classical period, the Middle Ages, the Renaissance and the beginnings of the modern, mechanized period.

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FOUNDRY HANDYMAN

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6 h.p. Moto-Bug climbs 20% ramps fully loaded . . . clears 33-inch aisles. Turning radius is short, only 61 inches. Operator takes it easy . . . rides on rear step for all traveling, backing and spotting. There's full power in both directions. Reverse is instantaneous. 3.6-to-1 gear ratio on big steering wheel adds to operating ease. To unload, foot pedal releases gravity-dump body. Or, rate of discharge can be snub-line controlled.

Moto-Bug usefulness is multiplied by changing from hopper to ¾-ton platform, or ½-ton (5-foot) fork lift. Let us show you how Moto-Bug can make man-hours more productive on all kinds of material-handling jobs. Ask Kwik-Mix distributor for a demonstration.

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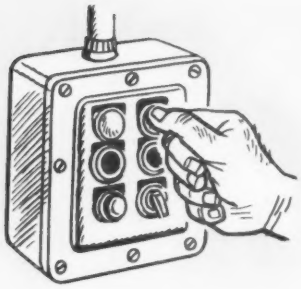
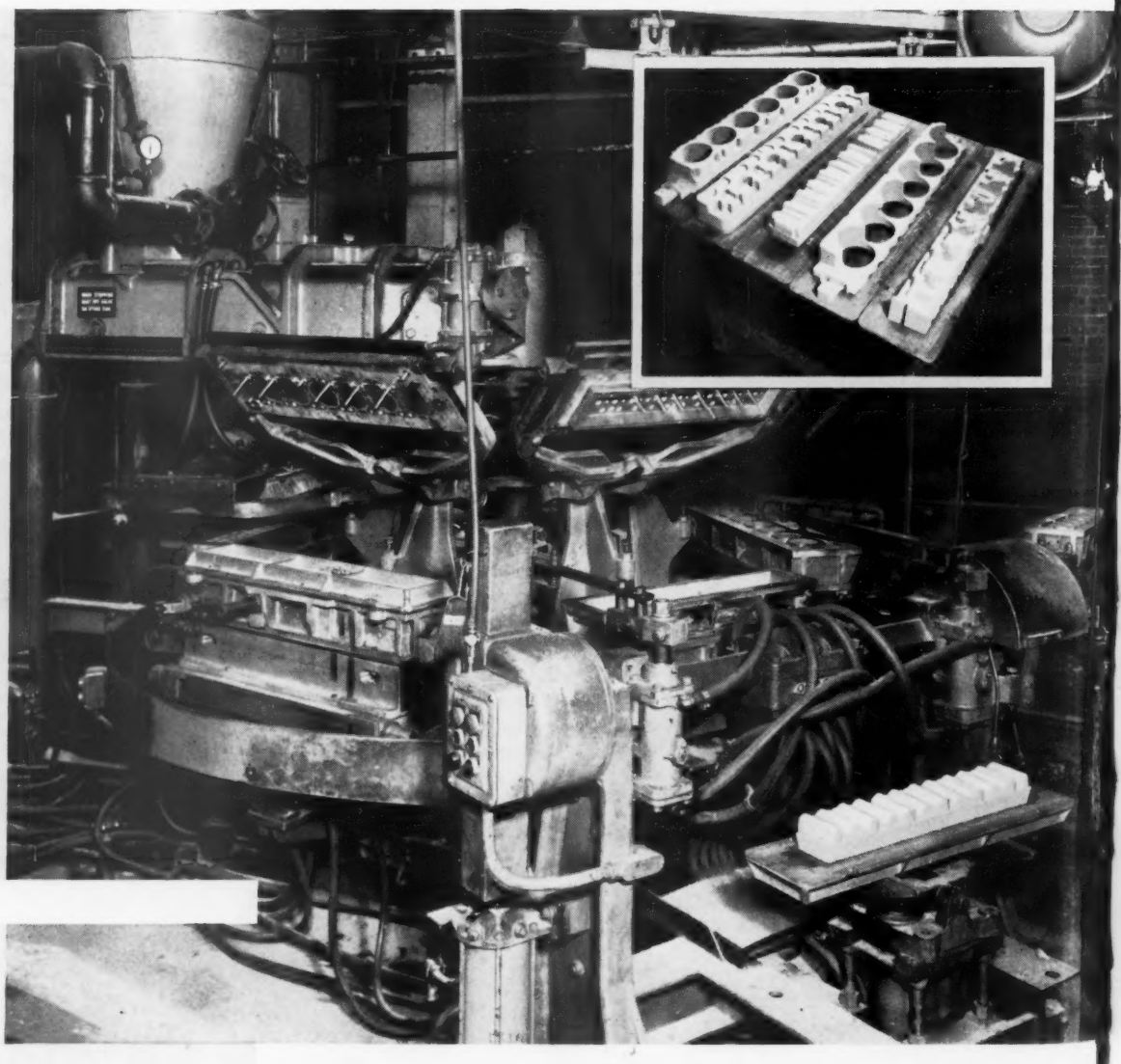


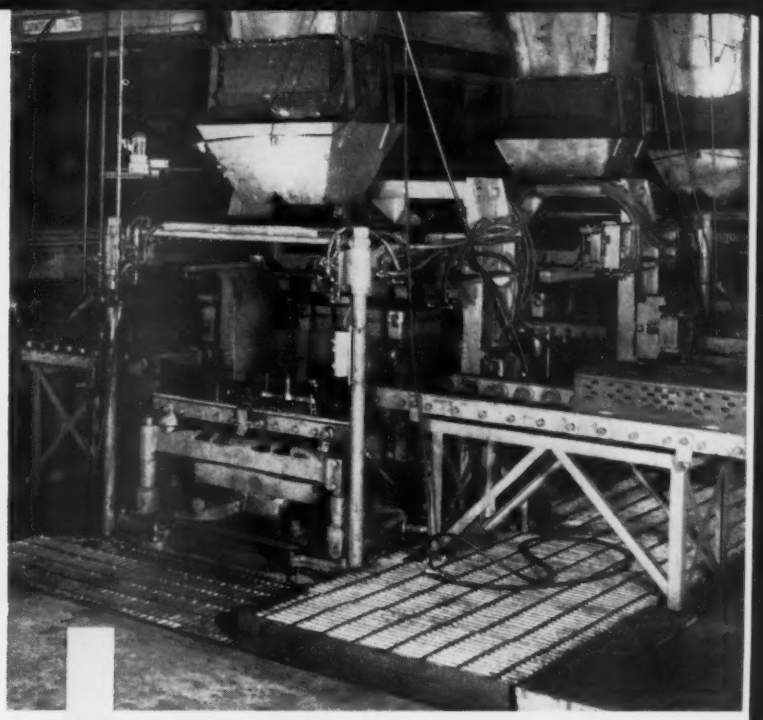
With the push of a button *many sand molding and core blowing operations are now done automatically . . . on repetitive cycles. Result — more efficient production of molds and cores at lower and lower cost.*

OSBORN AUTOMATION... IS REALLY CUTTING COSTS IN FOUNDRIES EVERYWHERE



Osborn Roto-Core Automatic with Cope Handler is set up to make these 5 different cores in succession. At a rate of more than 300 core boxes per hour.

Cope and drag are here made simultaneously. The machine automatically jolts, squeezes and strips the mold in proper sequence.



10 Osborn Jolt Squeeze Strippers with side roll-on and roll-off, power operated squeeze heads and semi-automatic controls.

How to start cutting your costs

Perhaps many of your molding and core blowing operations can now be done automatically on Osborn machines. Field reports prove your costs will be less with Osborn automatic equipment because:

1. Production on Osborn's machines with repetitive automatic cycles is uniform throughout the day.
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3. Fewer manhours are needed . . . production is at a constant rate . . . cost per mold or core is lower.

The installations shown are but a few of many new molding methods developed at Osborn to cut your foundry costs.

Call an Osborn foundry specialist now to look over your jobs. He can show you how Osborn automatic machines can be applied to save you money. Call or write . . .

Here 135,000 quality cores a day are made on 29 Osborn Automatically Controlled Core Blowers. They blow a core box every 6 seconds, using one operator.

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MOLDING MACHINES **CORE BLOWERS**

Another example of
Osborn leadership
and advanced engineering

Melting Iron in the REVERBERATORY FURNACE

By CARL G. de LAVAL
Pittsburgh Alloy Co.
Pittsburgh

FOR highest operating efficiency, lowest costs, and optimum metal quality when melting iron in the reverberatory furnace, it is necessary that the melting action be rapid. The most important single controlling factor in the development of fast melting is the action at the throat where solid metal becomes liquid metal.

The flow of material both prior to and through the throat depends on gravity. Any refractory contour which might even slightly retard the settlement by gravity of solid metal to the throat, or hinder the easy flow of liquid metal away from the throat, will not only reduce melting speed and efficiency but can result in lowering element recovery—and thereby metal quality.

Observation Hole Useful — The throat is so important in the investigation of any operating unit that a small observation hole should be provided through one of the side walls of the furnace so that the investigator may readily view the throat action as the melt-down proceeds.

For simplification it is assumed that the combustion system is efficiently and adequately delivering the heat units, not only under empty furnace minimum pressures, but also under the most adverse high furnace pressures existing during full stack and melt-down conditions. It is further assumed that refractory quality and operational practice are such as to preclude any operational failure or partial hindrance to good operation. The performance of the furnace then depends entirely upon the stack, the throat and the hearth.

Because the flow of material is from the stack to the throat and thence to the hearth, these elements will be discussed in that order with major emphasis placed upon the throat because of its importance.

The stack performs three functions:

1. Acts as a storage chamber for solid metal.
2. Acts as a preheating chamber for solid metal.
3. Acts as a gravity feeder of solid metal to the throat.

The throat performs only one function:

1. Acts as a "selector" orifice in that it stops the flow of solid metal and allows the onward flow of liquid metal.

The hearth performs three necessary functions and a fourth if desired:

1. Acts as a receiving basin for liquid metal.
2. Holds the liquid metal through the superheating period.
3. Holds the metal for the refinement period.
4. Holds the metal for alloying additions, if desired.

Vertical Stack Walls Best — The stack should be of simple arrangement with vertical walls so as to present absolutely no obstruction to the easy downward settlement of the solid metal. This permits the rate of settlement to be directly proportional to the rate of melting at the throat. A tapered stack, with the smallest opening adjacent to the throat, can cause wedging of the charge and a slowing down of the rate of flow of metal throughout the entire furnace system. This results in consumption of more fuel units per ton of metal and increases both fuel and labor costs. In addition, there will almost always be an unnecessary silicon loss in the stack, caused by the solid metal being exposed over an unduly long period to convection temperature.

This silicon loss at convection temperatures is a natural phenomenon and can only be minimized by rapid movement through that temperature range. As soon as the metal solid reaches a temperature above the convection range, silicon is no longer lost in the stack.

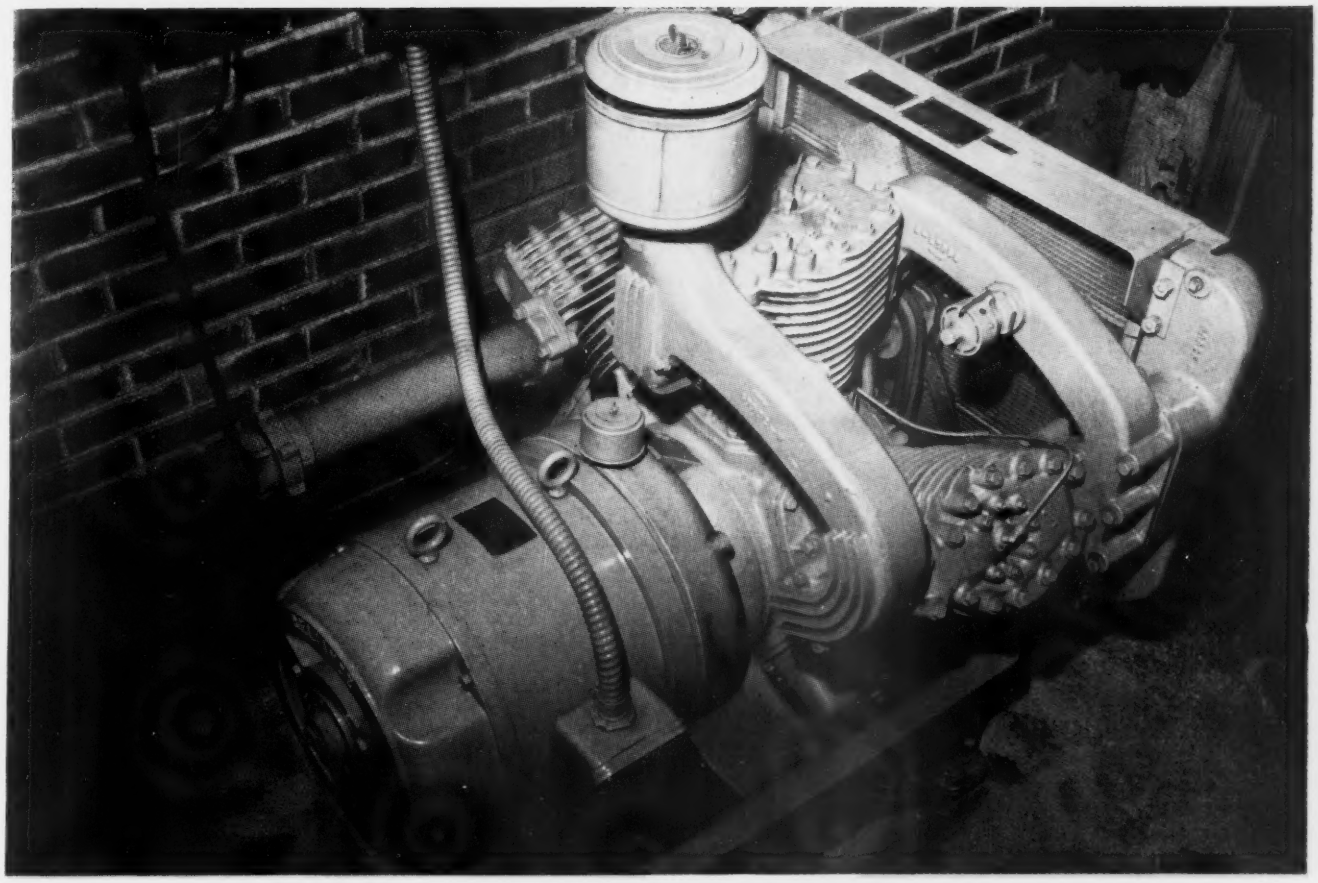
The same adverse silicon loss must also be reckoned with in very tall stacks for the same reason. As a rule, if the stack is no higher than other parts of the furnace and the walls are vertical above the throat, element and metallic losses in the stack will be negligible, provided the throat is functioning properly.

The throat is a "selector" orifice. There can be a dimensional variation within reasonable limits without impairing its efficiency. The optimum throat area can be arrived at only by actual experience. There are three entirely different throat conditions during operations: Before metal charging, the throat is entirely open; during melt-down, the throat is plugged with pieces of metal and the effective opening is only that provided by the spaces between pieces; and after melt-down, the top surface of the metal bath may or may not allow the throat to return to its original full opening.

Throat Orifice Critical—Seemingly, each furnace manufacturer and each operator has determined by trial and error the throat opening area he believes performs best. If the throat orifice is too small, the conversion of solid to liquid will be slowed up; if the throat is too large, a good percentage of the pieces of metal will roll on into the hearth. In this latter event, the most desirable melting action which is unique to this type of melting unit will not take place, and, therefore, the unit will not perform at its best.

Assuming that the stack is properly feeding metal solids to the throat, and that the throat is performing its function of blocking the continued flow of solids but allow-

(*Continued on page* 226)



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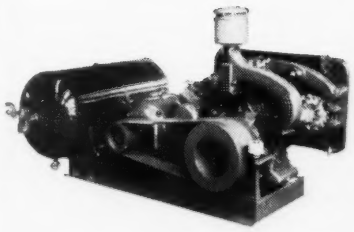

Joy WL-80 "Packaged Unit" Compressor can be delivered ready-to go, complete with air receivers, piping and wiring.

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. . . And, you have your choice of drives: Direct, V-Belt, Flange-Mounted. In fact, these compressors are available as packaged units, like that shown at the left, delivered complete with air receivers, piping and wiring.

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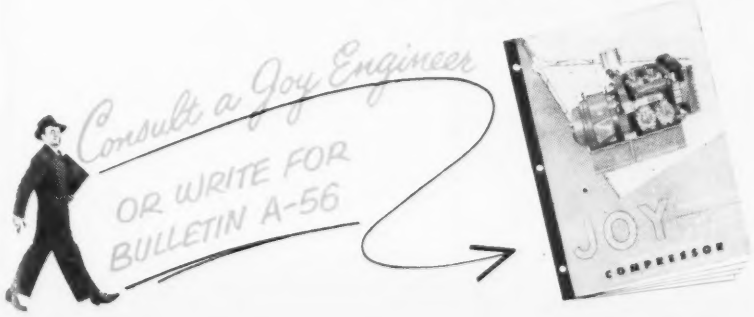
Get full details by writing for Bulletin A-56. ● ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



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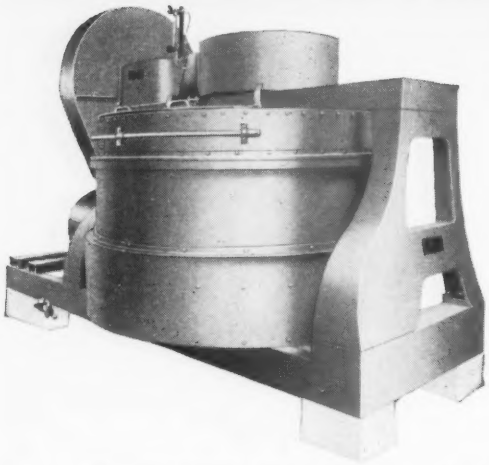

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TAMMS INDUSTRIES, INC.
228 N. LaSalle St., Chicago 1, Illinois

(*Continued from page* 224)

ing the free escape and flowing away of liquid metal, a most desirable melting action is taking place. It may be called *bottom-pinpoint* melting. Actual visual observation shows small droplets and driblets of metal falling away from the exposed surface of the piece. This continues rapidly until the piece has vanished and is replaced by a succeeding piece.

While approaching the throat, each piece is surrounded and bathed with heat units which produces the most rapid rate of heat penetration through its cross section. Compare this action with the conventional hearth loaded furnace. In the latter case, the piece rests on the hearth. At first the piece extracts heat from the hearth through its bottom surface; at the same time heat is penetrating from above. Later the heat penetration rate from above exceeds the extraction of hearth heat from below, and the hearth contact surface starts to receive heat from the piece. Finally, the heat penetrating from above has progressed through the piece and into the hearth to bring the piece up to melting, and the entire piece liquefies almost at the same moment and not in droplets and driblets such as takes place in a satisfactory throat.

Produces Larger Liquid Surface

An important phenomenon takes place during both types of melting action in regard to sulphur. As iron is melted, sulphur migrates to the surface. The products of combustion from natural gas and well-atomized fuel oil include unattached and loose atoms of hydrogen. These hydrogen atoms have a strong affinity for sulphur, forming H_2S and maybe going into H_2SO_4, thus uniting with the sulphur which has migrated to the metal surface. The formation of H_2S being a function of metal surface area, it is reasonable to assume that a type of melting which produces a larger liquid surface per unit of weight than another type of melting will show a much larger loss of sulphur. Consequently, the throat opening should prevent solid pieces from going through the throat and into the hearth area but not be too small to seriously choke heat release.

Up to a certain point throat enlargement does not seriously affect temperature, but beyond that point it does. Most operators have established this critical point, and when it is reached, they rebuild the throat

(*Continued on page* 228)

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U. S. ROYAL NEOPRENE COATED CANVAS WITH NYLON FINISH

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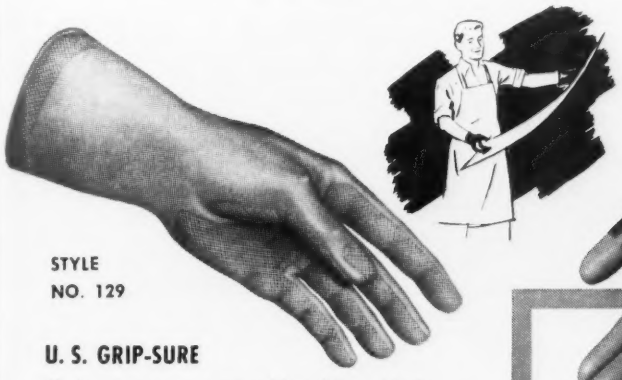

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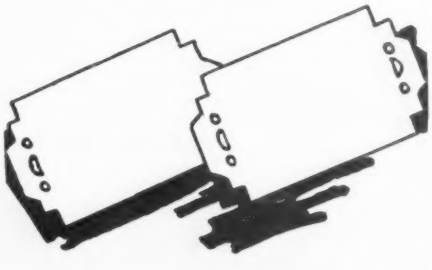


The SCIENTIFIC CAST PRODUCTS Corp.

1390 East 40th Street
CLEVELAND 3, OHIO

2520 West Lake Street
CHICAGO 12, ILLINOIS

(*Continued from page* 226)

area. Throat construction must be such as to give the longest possible life with long retention of its original dimensions. In addition, all parts of the throat should be reasonably accessible for repairing and replacement when necessary.

The hearth must provide a quick and easy run-off for the liquid metal generated at the throat. This metal leaving the throat and entering the hearth does not have much degree of superheat. Test runs using continuous charge and continuous tapping gave temperatures which fluctuated in the 2700° range—2750°, 2780°, and very infrequently close to 2800°. These temperatures were below the desired range and batch melting was resumed.

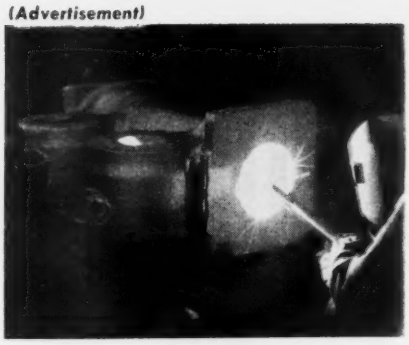
Melt Down the Charge—It is best to completely melt down the charge and hold the metal on the hearth for temperature pickup to the desired range. A properly operated hearth and bath will show an increase in temperature from 2700° to 2800° F or higher in a holding period of 10 to 15 minutes, providing the insulating effect of the slag blanket is not adverse. An experienced operator can readily prevent such interference with temperature attainment. While the bath is superheating at higher temperatures, complex refinement reactions take place which seem to produce exceptionally good fluidity and beneficial grain refinement. Upon completion of the bath-holding period or during that period, special alloy additions such as silicon, manganese, chromium, etc., but not carbon, can be made with high element efficiency.

Mention was made of refinement reactions at high bath temperatures and which were beneficial to the tapped iron. With metal tapping temperature near 2800°, the metal bath temperature and slag temperature is sufficient to favor the reduction of SiO_2 in the slag by carbon in the metal bath. This reaction, because of the free and nascent silicon entering into the bath, seems to produce beneficial effects such as grain refinement, etc., similarly experienced by late deoxidizer additions to the ladle. The practical effect on final metal analysis is negligible on carbon and an improvement in silicon recovery in the bath which has been reported as high as 100% in some instances.

The following element losses in per cent were obtained in a gray iron foundry operation with metal tap hole temperatures at 2750° to

(*Continued on page* 230)

(Advertisement)



ARCAIR TORCH slashes gouging & cutting costs

Using only ordinary DC welding current, low cost electrodes and compressed air, the Arcair gouging and cutting torch is now saving thousands of man hours and eliminating up to 80% of hourly operating costs required for other processes of metal removal.

The Arcair Torch is being widely utilized by leading foundries to gouge defects and remove unwanted metal. It is many times faster than chipping and much cheaper to operate than oxygen cutting. The Arcair torch functions in all positions, works on stainless and alloy steels as readily as on carbon steel, and requires no special skill or adjustments for use on different metals.

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Write for free bulletin with facts and photographs of time and money-saving applications of the Arcair Torch. Arcair Company: EASTERN DIVISION, P.O. Box 337, Lancaster, Ohio; WESTERN DIVISION, P.O. Box 4107, Bremerton, Wash.

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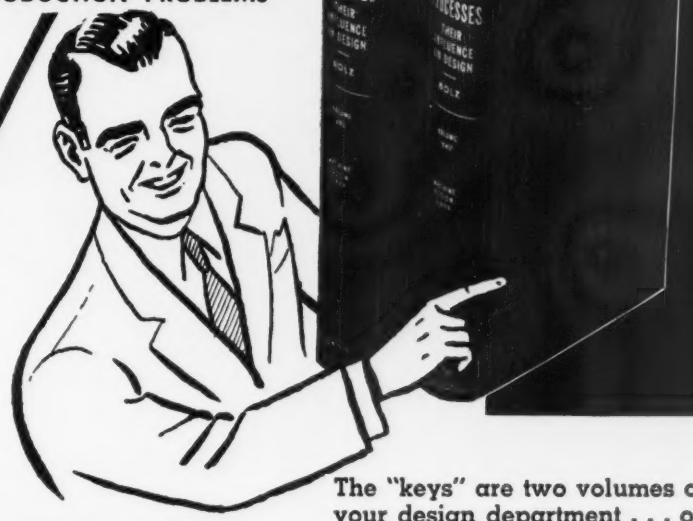

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VOLS. I & II

By Roger W. Bolz

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The "keys" are two volumes on how you can bring the shop into your design department . . . on how you can actually plan your designs for smoother production. "Production Processes", with 924 pages of authentic text, charts and illustrations covering 56 different shop processes, can help correct your design-production mishaps . . . correct them while the designs are still in the drawing board stage! Here is production know-how in advance and in place of trial and error on the line. Here in two volumes is what design and production men all over the country regard as their "keys" to designing for low-cost production. You get usable information on how to select materials . . . you see the surface finishes produced by the various processes . . . and you find explained the practical tolerances which can be held while using these processes.

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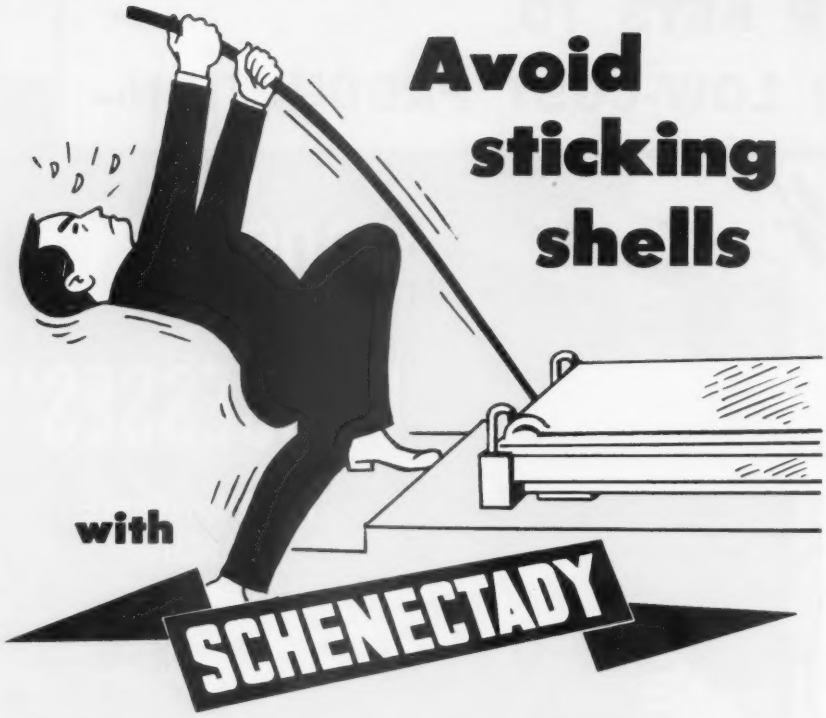

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There's no pattern build-up with this solvent-type lubricant, specifically designed for the shell mold process. But more important, there is no time lost because of "sticking" shells or pattern cleaning. Shells eject easily every time with Schenectady SS-452 Silicone Release Agent.

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SCHENECTADY

(*Continued from page* 228)

2900°:

	TC	Si	Mn	S	P
At completion of melt-down	5	8	25	50	0
10 to 225 min after melt-down	5	0	25	50	0

A similarly caused silicon pickup was also "detected" but not chemically determined on another furnace tapping hard iron at 2800° F or higher. In the hard iron melting operation the over-all element recoveries were not quite the same, but they were still good.

A clear explanation of this silicon pickup is provided in *Transactions*, American Foundry Society, Vol. 29, 1951, in a paper by E. A. Lange and R. W. Heine entitled "Some Effects of Temperature and Melting Variables on Chemical Composition and Structure of Gray Irons."

Attainable element recovery has been tabulated. Fortunately, the same metallurgical conditions which produce good element recovery also are conducive to extended refractory life if proper type and quality refractories are used. In addition, these same metallurgical principles can be used to completely nullify the otherwise destructive effect of the most rapid iron melting combustion adjustment.

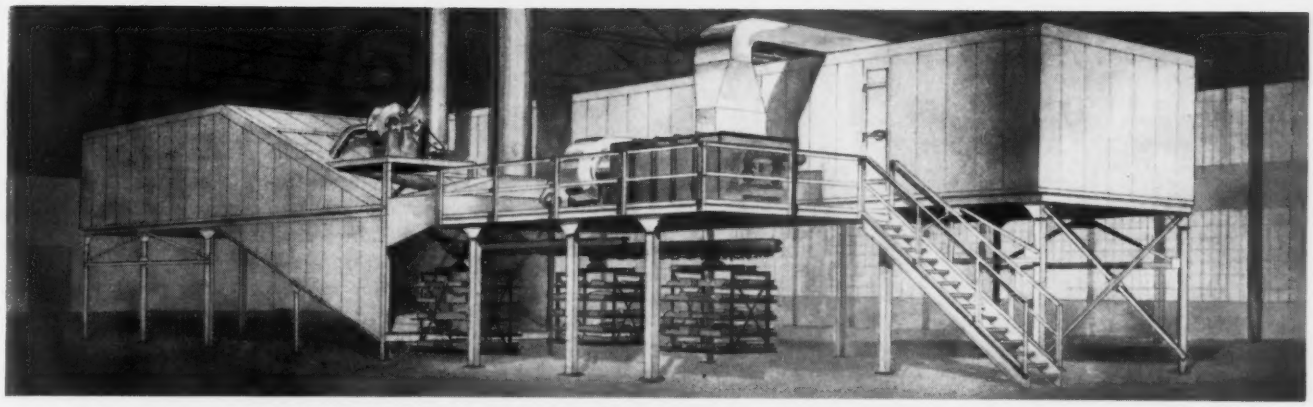
All evidence indicates the superior, beneficial results of operating these furnaces at the higher temperature range as compared to the lower temperature range.

Adjust Carbon Content

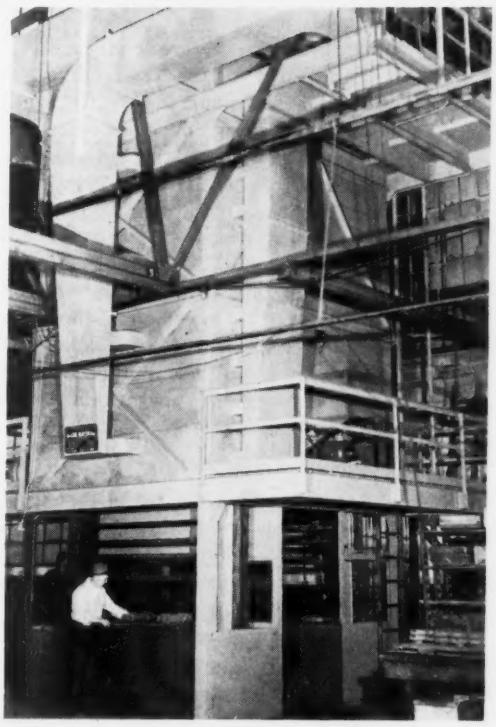
In regard to carbon raising, there is no more efficient and lower cost means of increasing carbon content than proper pig iron quantity in the stack metal charge. Mexican graphite briquets have been used as an empty furnace addition before cold metal charging, and the carbon content can be substantially raised by always maintaining a surplus of these briquets in the empty furnace. Experience also indicates that carbon recovery may be improved by keeping manganese on the high side by small stack additions of lump ferromanganese or manganese briquets.

One last and final comment in regard to the hearth is that the tap-out operation should remove all metal and slag; the hearth should always end up clean. A "dirty" furnace is a costly furnace to operate, and it indicates, many times, the development of trouble in succeeding heats. For these reasons, an observation port of some kind should be provided; the simpler the better.

(*Continued on page* 232)



CARL-MAYER HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co. Patent No. 2355814.



CARL-MAYER VERTICAL CORE OVEN at G.&C. Foundry Co. Patents No. 2,628,396 and 2,257,180.

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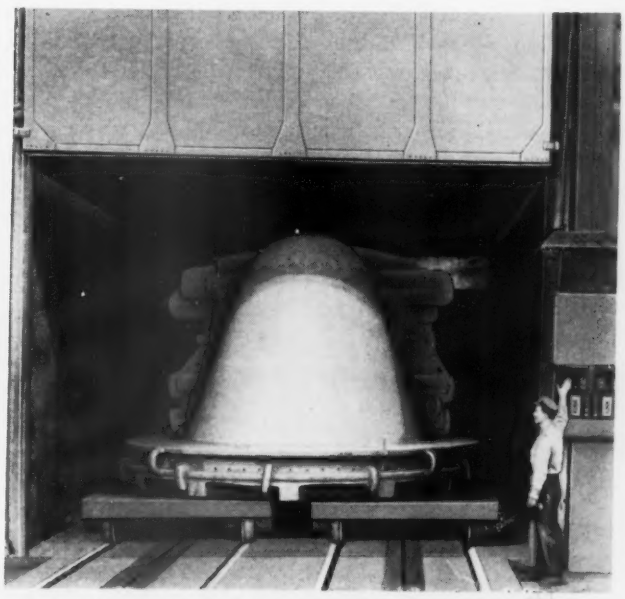
Carl-Mayer designs embody patented features which contribute to highest efficiency and economy in operation.

It will pay you to consult us on your next core baking and mold drying problem. We build ovens of all types and sizes, also other types of industrial ovens and furnaces. WRITE FOR BULLETIN NO. 53-CM.



CARL-MAYER MOLD OVEN. One of a battery of two at Pittsburgh Steel Foundry Corp. Capacity: 100 tons per charge (each oven). Patent applied for.

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(*Continued from page* 230)

Leaving out a brick or two above the slag line and opposite the tap hole provides excellent observation and is easily maintained and closed during melt-down.

Metal tap temperature is a very important operator specification. There seem to be two operator specifications—one group requiring 2800° F or higher and the other group requiring only 2600° to 2650° F. The observation opening for hearth performance investigation can also be used to appraise metal temperature performance if the following is borne in mind. Optical pyrometer readings should be made of the empty furnace before charging. It is important to use readings taken off the hearth surface rather than side wall reading, because often the hearth is not up to the side wall in temperature. The most desirable condition is a uniform and equal temperature over all parts of the hearth and side walls. As a rule, the metal tap temperature will be at least 150° F lower than the overall uniform hearth and side wall temperature, but the difference may be even larger if operational practice is not proper.

Should Time Melting Operation

Rapid melting is very important. The observer should have some comparative time data so that he may properly appraise furnace performance. The following methods of timing are suggested:

A. *From start of charge to completion of melt-down only.* The melt-down action can be observed to have been completed when the stack flame returns to full volume. Other more accurate means may be used, but the equipment is usually not available. Practice makes the visual determination of melt-down completion fairly accurate.

B. *From start of charge to start of tap.* This includes any holding time which, if for superheating, should be charged to the furnace, but if because of foundry operational delays, should not be charged to the furnace. Such unnecessary delays should be deducted from this overall time in order to obtain an accurate record.

C. *Time required for complete melt-down of the last stackful of metal.* In this case, prior tests should be made to determine the weight of the metal in the completely filled stack. This is a preferred measurement, as it eliminates certain variables and would make for more direct comparison of furnaces

in different shops.

Actual field data on all of the above time tests are very meager. The following data from actual observations, information from operators, and published articles, must be substantially increased by additional field tests before any definite standard of perfection can be established for general use.

The following tabulation is based on time per 2000-lb unit of iron foundry metal charged. It does not take into account the cross-sectional thickness, which is a most important factor in melt-down time, nor the type of metal—pig iron, hard iron or soft iron—which is also important to some degree. The effect of these variables should be investigated in additional work.

MINUTES PER 2000 LB OF IRON

Item	Tapping Temp.	A	B	C
1	2600°	35	45	*
2	2750°	32	44	*
3	2850°	33	40	20
4	2700°	*	120	*
5	2700°	*	83	*
6	2700°	*	48	*

*No information. A—Start of charge to end of meltdown. B—Start of charge to tap. C—Last complete stackful.

Of interest was the test melting of high-Cr high-Ni steel scrap (20 Cr, 16 Ni, .76 Si, 0.38 C). From start of charge to end of melt-down (A)—54 minutes. From start of charge to tap (B)—67 minutes. Last complete stackful (C)—25 minutes. These times are also per 2000 lb of this high-alloy steel scrap.

This article should be of value in investigating and appraising this type of unit in the field. It has described simple and practical approaches to this task and has pointed to certain important and critical observations. Of all of these the most important concerns the action at the throat, and the performance at that point cannot be stressed too strongly. The throat is "the furnace" for all practical intents and purposes, and its performance will determine largely whether or not the unit performs efficiently. In field investigations, start with the throat and frequently return to the throat in diagnosing the performance of any iron melting reverberatory furnace.

The suggested time studies, a good optical pyrometer, open hearth colored glasses, the suggested observation openings, and chemical analyses of metal just after melt-down and after a superheating period will do much to accurately appraise different operating units.

If the investigator will bear in

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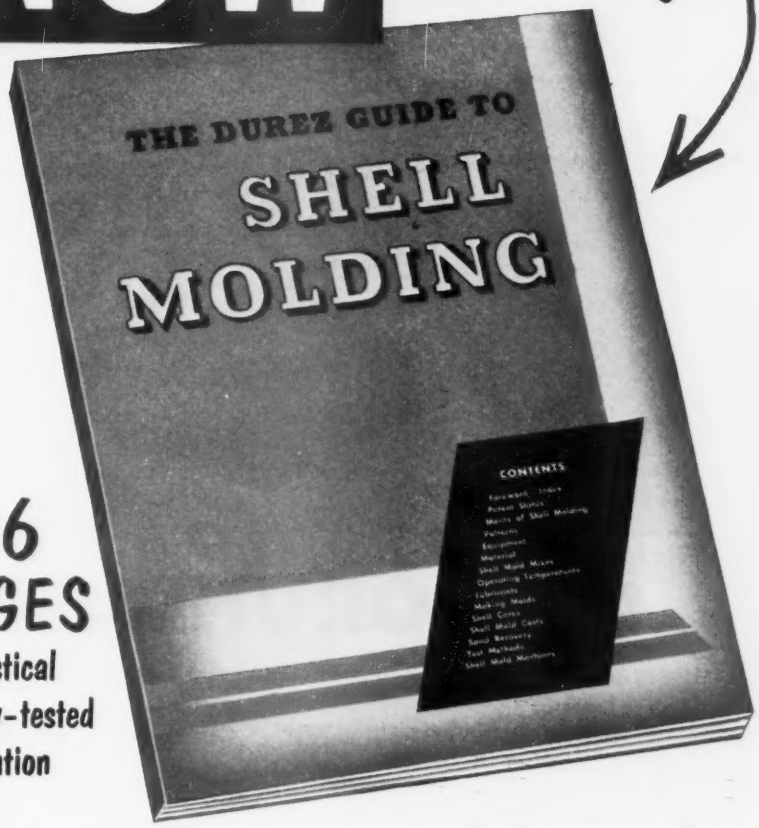

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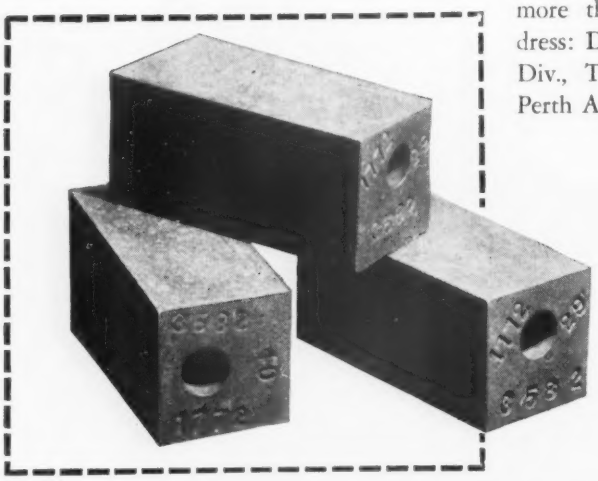

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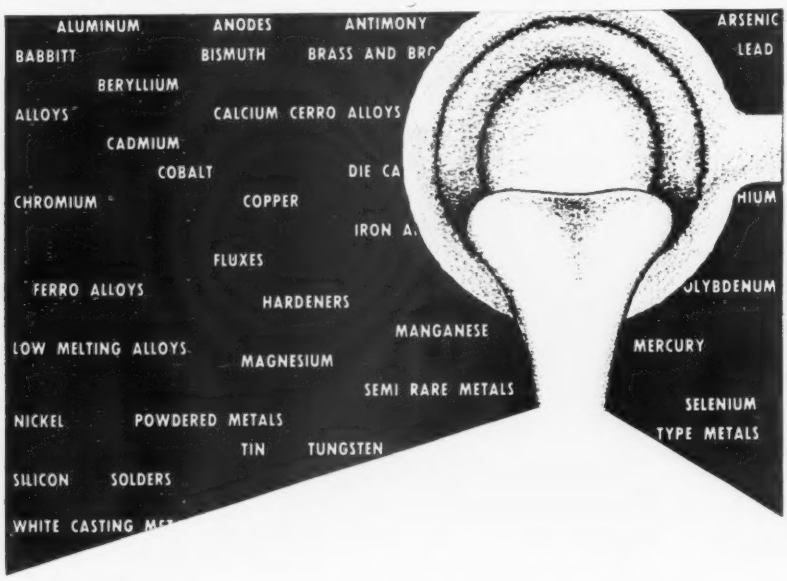

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mind all of this information, much of the controversy which has so frequently complicated the performance picture of this type of iron melting unit will disappear, and actual performance facts will be clarified.

Philadelphia Is Site of East Coast Conference

Eastern foundrymen will meet at Philadelphia Mar. 19-20 for the first East Coast Regional Foundry Conference to be held there since 1946. Chesapeake Chapter of the American Foundrymen's Society will be host to the meeting, which also is sponsored by the Philadelphia and Metropolitan New York Chapters.

Technical sessions are scheduled for Friday morning and afternoon and Saturday morning. A dinner will be held Friday evening, and the conference will conclude Saturday noon. All meetings will be at the Benjamin Franklin Hotel.

Conference details follow:

Friday, Mar. 19

9 a.m.—Registration.

9:45 a.m.—Opening Remarks.

10:15 a.m.—**Principles of Gating and Feeding**, by W. S. Pellini, Naval Research Laboratory, Washington, D. C. Chairman, R. J. Ely, American Brake Shoe Co., Mahwah, N. J.; co-chairman, R. B. Fischer, Ingersoll-Rand Co., Phillipsburg, N. J. Panel members who will comment on the application of the paper to each metal: Steel, E. A. Zeeb, Dodge Steel Co., Philadelphia; gray iron, J. Fecko, Worthington Corp., Harrison, N. J.; malleable, T. M. Blank, Pennsylvania Malleable Iron Corp., Lancaster, Pa.; nonferrous, E. J. Bush, U. S. Naval Gun Factory, Washington, D. C.

12:30 p.m.—Luncheon: Chairman, W. D. Bryden, Philadelphia Bronze & Brass Corp., Philadelphia. **Quality Control in the Foundry**, by F. B. Rote, Albion Malleable Iron Co., Albion, Mich.

2:30 p.m.—Round table discussions on **Economics of Good Melting Aluminum and Magnesium:** Chairman, J. O. Danko Jr., Arlington Bronze & Aluminum Corp., Baltimore; co-chairman, E. V. Lanfranke, Rolle Mfg. Co., Lansdale, Pa.; discussion leader, D. L. LaVelle, American Smelting & Refining Co., South Plainfield, N. J.

Brass and Bronze: Chairman, B. M. Loring, consultant, Washington, D. C.; co-chairman, C. Schwalje, Worthington Corp., Harrison, N. J.; discussion leader, H. C. Ahl Jr., Down River Casting Co., Rockwood, Mich.

Gray Iron: Chairman, H. P. Good, Textile Machine Works, Reading, Pa.; co-chairman, L. H. Gross, American Radiator & Standard Sanitary Corp., Baltimore; discussion leader, H. H. Kessler, Sorbo-Mat Process Engineers, St. Louis.

Malleable: Chairman, H. L. Ullrich, Sacks-Barlow Foundries, Newark, N. J.; co-chairman, W. H. Cantwell, Eastern Malleable Iron Co., Wilmington, Del.; discussion leader, J. H. Lansing, Malleable Founders' Society, Cleveland.

Steel: Chairman, C. B. Jenni, General Steel Castings Co., Eddystone, Pa.; co-chairman, Bert Troy, foundry engineer, Riverton, N.J.; discussion leader, C. E. Sims, Battelle Memorial Institute, Columbus, O.

Evening: Cocktail party and dinner.

Saturday, Mar. 20

10 a.m.—**Should I Adopt Shell Molding**, by T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va. Chairman, B. N. Ames, Doran Manganese Bronze Co., Brooklyn, N. Y.; co-chairman, K. Davis, Budd Mfg. Co., Philadelphia. Panel members who will comment on the paper: Malleable iron, L. R. Spann, Eastern Malleable Iron Co., Naugatuck, Conn.; patterns, E. H. Rubovitz, Newark Pattern Works, Newark, N. J.; plastics, A. Bzdula, General Electric Co., Detroit.

12 noon—Conference adjournment.

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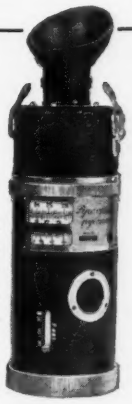

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GIFS Requests Data from All Gray Iron Foundries

Gray Iron Founders' Society, Cleveland, is sending questionnaires to all gray iron foundries in the country this month in an attempt to gather accurate facts which will help improve direct and indirect services to the entire industry as well as to individual foundries. The questionnaire is part of the society's effort to evaluate its own programs to determine how its work can best be fitted to meet the needs of the industry in the current highly competitive market.

Data requested in the questionnaire are to form the foundation for association activities in connection with advertising, technical and product development, the analysis of present and potential castings markets, defense mobilization, new processes and equipment and other similar activities.

Questionnaire data is to be tabulated on International Business Machine cards and the cards filed at society headquarters. Use of such cards will permit reruns through the IBM machines to segregate specific data whenever the need for it arises.

Information gathered in a previous questionnaire in 1947 is outdated and the society is hoping that every gray iron foundry will fill in the current questionnaire so that complete, up-to-date data may be obtained, thereby increasing its usefulness to the whole industry and to each individual foundry.

Promotional Ideas Put Across Safety Program

Loaded with schemes that help sell safety to workers in new and appealing ways, the National Safety Council's new book "Showmanship in Safety," provides a lift for any accident prevention program. Containing more than 150 ideas for displays, demonstrations, stunts, awards and other interest-arousing devices, the book tells how to add sparkle to safety meetings, how to sell employees on wearing protective equipment and offers other ideas to put across the safety program.

Illustrated with cartoons and bound in a two-color heavy paper cover, the book sells for $1.25 to council members and double that price to nonmembers. For further information and quantity prices, write the National Safety Council, 425 North Michigan Ave., Chicago.

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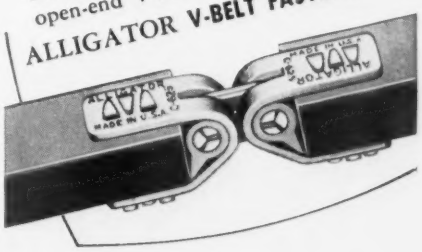

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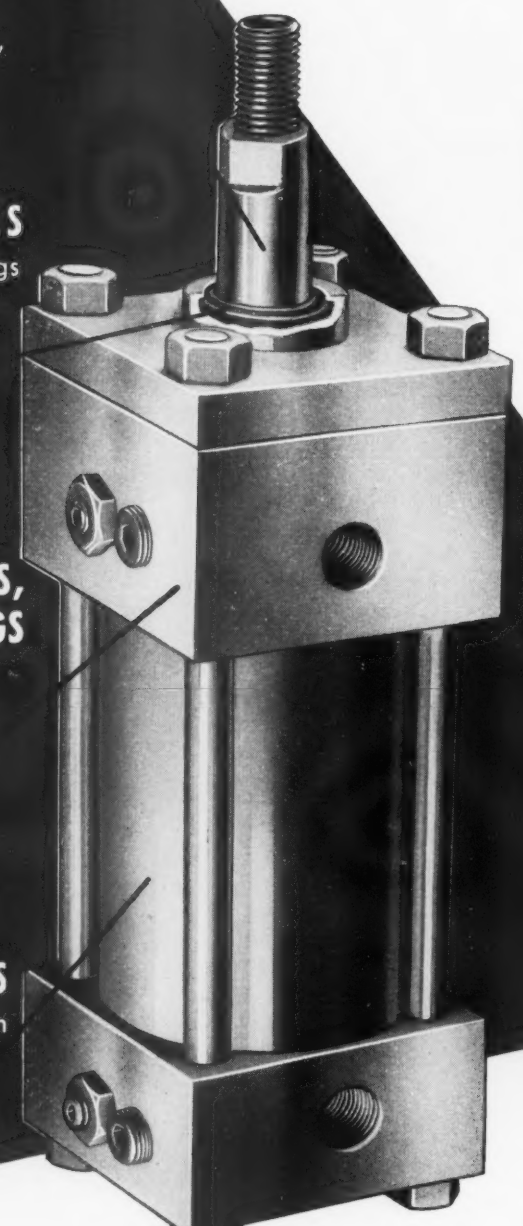

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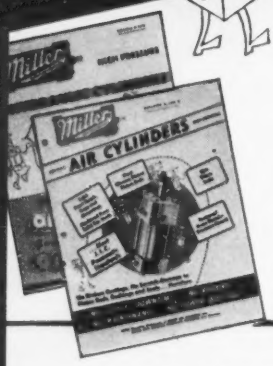
Cylinders are base Model A53 with foot, flange, and pivot mounting attachments available as desired.



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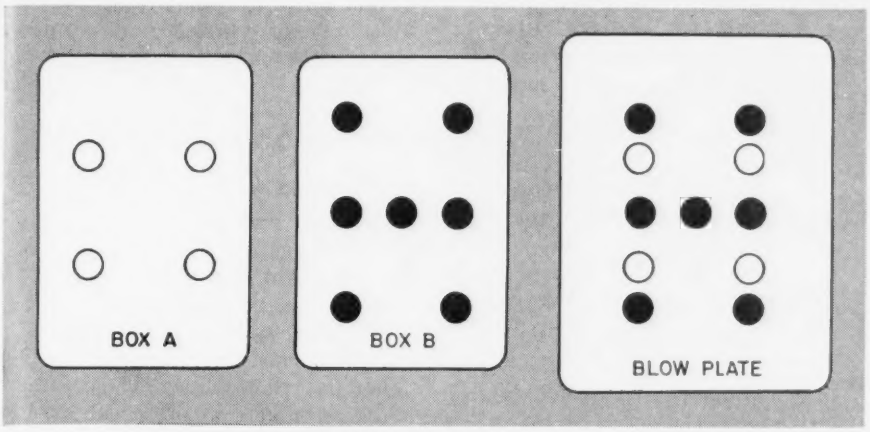


By different arrangement of the blowholes, one blowplate can serve two coreboxes without any change in the setup

Core Blowing Equipment and Use (IV)

USUALLY a blow box costs considerably more than an ordinary corebox to be used on the bench. The precision with which the former must be made and the time required to rig it properly make it more expensive. Cleanliness in operation and regular inspection in the pattern shop are necessary if the full life of the box is to be realized. Any sand left on the parting will allow air escape, carrying with it a little of the finer material in the sand mixture. Soon the larger grains will escape, with the result that the parting surfaces will be cut severely in a relatively short time. Brushing off the parting or cleaning it with an air hose after each blow will slow down production slightly but will increase the life of the equipment considerably.

Clean the Vents—It is equally important to keep the vents clean. Failure to do so will result in cores with soft spots. Increased back pressure also will increase the likelihood of leaks. An effective tool for cleaning slot vents may be made from a 6-in. length of hacksaw blade with one end pointed and ground down to about ¼ of its former thickness. For screen vents, the application of a concentrated solution of sal soda, and a few blasts from an air hose will do the work. Sal soda should not be used on wooden boxes; it will attack the finish.

Maintenance of a core blowing corebox consists principally in replacing worn vents and sand entrance hole sleeves. Wear plates directly below blowholes must be renewed occasionally. The parting of the box can be kept in good shape by lapping with valve grinding compound or similar abrasive. The same applies to the top surface of the box. The important feature is to prevent leaks by keeping surfaces which must be sealed at blowing time in such good condition that solids never escape through them.

Highly specialized or unique core sand mixtures are not required for the core blowing machine. However, certain points deserve consideration: 1) Round-grain sand flows better and cuts the box less than angular grain sand. 2) Permeability should be kept as high as possible to facilitate passage of air through sand to vents. 3) Moisture should be kept to the low side to prevent the sand from sticking to the corebox.

Where the Machine Excels—Advantages of making cores on a blow machine instead of on the bench include: 1) High speed and therefore low cost. 2) Uniformly high quality cores. 3) Cores extremely difficult if not impossible to make on the bench can be blown readily. 4) Pasting practically is eliminated. 5) Cores can be made by relatively unskilled labor. 6) Frequently it is possible to combine several cores in one unit. In bench work the cores would have to be made separately, then pasted and assembled.

Time required to fill the corebox with sand and ram it to the required density on the blow machine never is more than a second or two. The same operation on the bench might take 5 minutes or more. On the average the direct cost of blown cores is less than one-eighth the cost of cores made by hand on the bench. It does not take long to amortize the cost of corebox and drier shells. If the box is rigged properly, if the sand is suitable and if the vents are kept clean, the quality of the blown cores will be uniformly high. Under the foregoing conditions the under ramming and over ramming often found on hand rammed cores are eliminated.

Cores can be made on the blow machine which would be difficult if not impossible to make by hand on the bench. Sand easily can be blown into narrow or irregular parts of the corebox where it would be impossible to pack it with a stick. Designing engineers can set up jobs in a way it would be impossible to follow in the foundry if limited to hand-rammed cores. This reduces costs in the molding department and in the coreroom.

Elimination of practically all pasting is an important item. Cores made on the bench in two or more sections, then pasted and mudded, usually can be made as a single unit on the core blowing machine. Cost of assembling is eliminated and the cores present a better appearance. Use of relatively unskilled workers is a factor in reducing coreroom costs. To convert an inexperienced person into a passably good blow machine operator requires only a few weeks.

Things To Watch—Very stiff sands are hard to blow. When green compression is more than 4 or 5 psi the sand will form craters, like inverted cones, in the head of the machine above each blowhole, and will not feed down properly. Another limitation on sands for use in a blow machine is that the permeability must not be too low. Sands with too high a percentage of fine material prevent the proper escape of air through the vents of the box at the time of blowing, thus producing soft spots in the

core. For castings with extremely heavy sections, which require low permeability cores, the blow machine is at a disadvantage.

A third objection to core blowing is the relatively high cost of good blow boxes. The objection is perfectly valid when the anticipated total production on the job is only a few hundred. However, as the number of required castings increases, the high initial cost of blow equipment becomes less and less important. The same argument applies to the heavy initial cost of the large number of drier shells required to keep a job running continuously.

A final limitation is the considerable time required to set up the machine for each job. Obviously this is of no consequence in the case of long running jobs. It may be minimized on short runs by combining two or more jobs on the same blow plate. A case of this kind is shown in the accompanying illustration. The two boxes A and B could be interchanged without any loss of time because each has a solid flat top which covers all the holes in the blow plate except those conforming to its own pattern. The wear plates in the bottom of each box are dimensioned to cause it to index properly with its own pattern of holes. Thus any number of boxes from two to six or eight may be blown after the machine is set up just once.

In a brief summary it may be stated that the core blowing machine is a modern, efficient, high-speed method of making good cores. For a small jobbing foundry with limited quantities of castings on each order, it is a needless expense. If approximately 5 per cent or more of the business is in the form of production runs, if the blow machine can be kept in operation two or three hours per day, it will amortize its cost long before it is worn out.

Safety Council Offers Training Films

Prepared under supervision of its industrial department, National Safety Council has announced a new series of human relation training films for foremen.

Included in the group, "A Gray Day for O'Grady" tells how a foreman learns about people; "Fragile—Handle Feelings with Care" shows how a foreman learns to value and respect the feelings of his workers; "Call 'Em on the Carpet" illustrates various methods foremen can employ to correct worker's faults without incurring ill will; and "It's an Order" is a humorous film showing how supervisors should give orders that are understandable and can be carried out efficiently by workers.

Films run 12 minutes each and are available as 16-mm sound movies or 35-mm sound slidefilms from the National Safety Council, 425 North Michigan Ave., Chicago 11.

Survey Shows Free Work Gloves Cut Accidents

Industrial plants which provide free work gloves to employees have less than half as many hand accidents as plants which do not supply them free, according to a survey completed last year by C. Walker Jones Co., Philadelphia, manufacturer of work gloves, mitts, hand pads and safety sleeves. The survey covered a representative group of firms in the sheet metal working industry.

In addition, the same ratio prevails for accidents of all kinds. Hand accidents in "free-work-glove" plants are 44.1 per cent of those in other factories, and all accidents run to only 44.5 per cent. Survey makers assume that the similarity of the figures indicates that the practice of supplying free work gloves is a provision of the most effective overall safety programs.

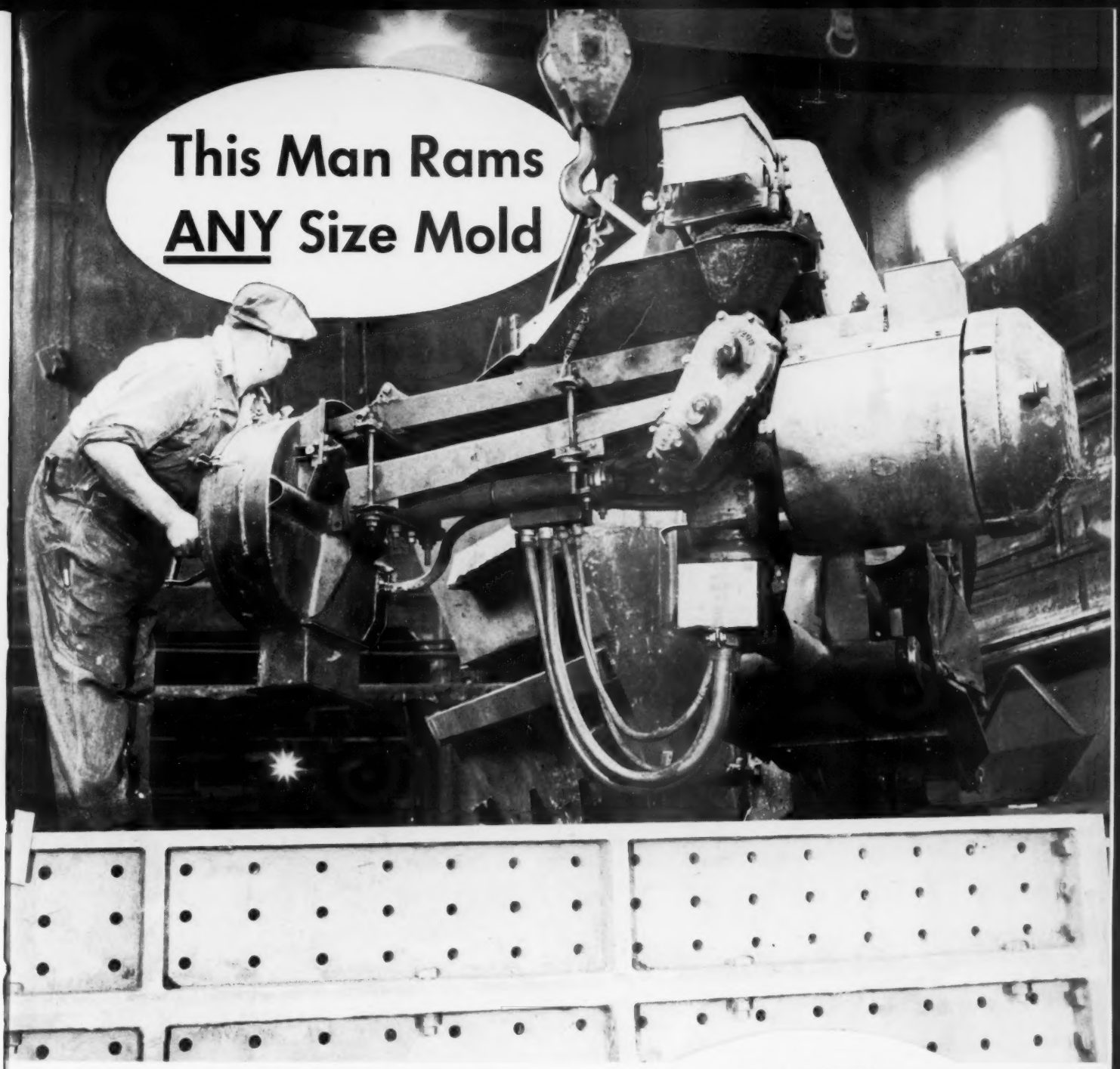
"Gesundheit! And wotta sneeze!!"

Book Review

Fehlererscheinungen an Guss-stuecken (Defects in Casting), by E. Knipp, 261 pages, 6 x 9 in., published by Giesserei Verlag, Duesseldorf, Germany. Price 26 D.M.

This book to the reviewer is extremely interesting since it pertains to the various defects such as pipes, cavities, blowholes, inclusions, etc., which occur in castings. Causes of the defects and means of prevention are discussed in great detail for cast iron, malleable iron, steel, copper-base alloys and light metals.

What makes the book so interesting to the reviewer is the widely different treatments required for prevention of defects in different metals, and that one which prevents blowholes in one metal might cause them in another metal. The reviewer is of the opinion that the book is worthy of translation into English. Based on the experience of the author as well as that of many other foundry experts, the book cites 280 references, almost all of which are woven into the text. Many of them are taken from British and American publications. — *W. Trinks, professor emeritus, Carnegie Institute of Technology.*



E•LONG LIMITED OF CANADA CHOSE A MOTIVE SANDSLINGER

Flasks as small as 24 x 24 inches, or up to 12 x 12 feet in size, and pits up to 33 feet long are rammed by the Motive Sandslinger at E•Long Limited. Wooden or metal patterns—mounted and unmounted—are rammed with equal ease. This kind of flexibility is obtainable only with a slinger.

E•Long's slinger is equipped with portable sand tanks. These are loaded with mulled sand directly from a Model "60" Speedmullor, and then placed on the slinger by crane. One-hundred-twenty tons of synthetic molding sand are mulled daily, and the total Speedmullor time cycle for complete mulling and cooling is only 80 seconds.

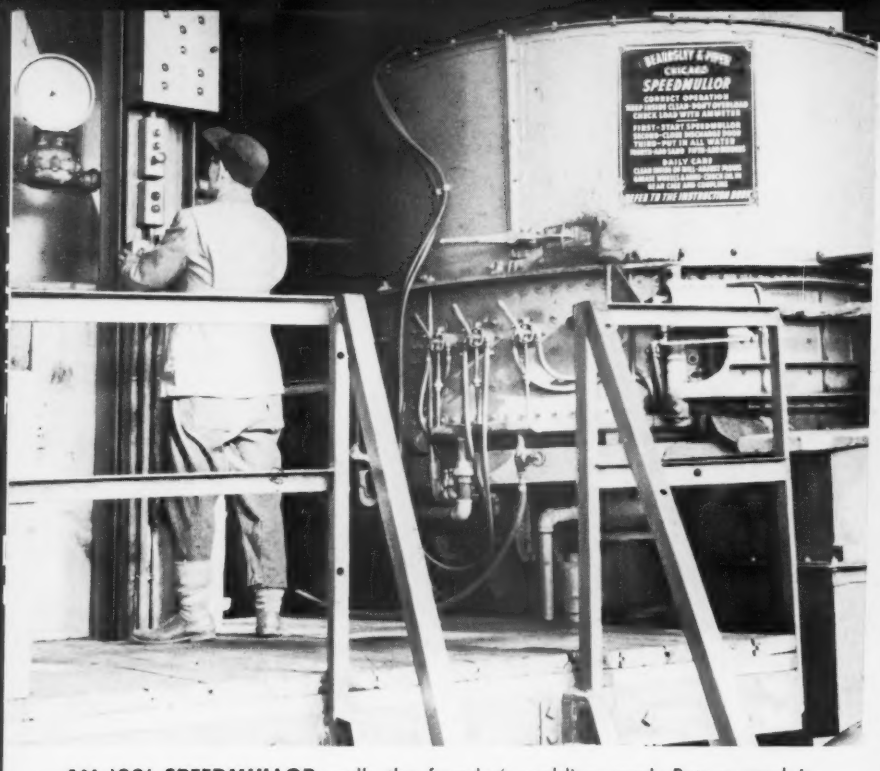
A 12 x 12 FOOT FLASK IS RAMMED AT E•LONG, AS A TANK OF SPEEDMULLOR MULLED SAND IS PLACED IN THE SLINGER'S RECEIVING HOPPER.

Write now for full information on Sandslingers and Speedmullors to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*

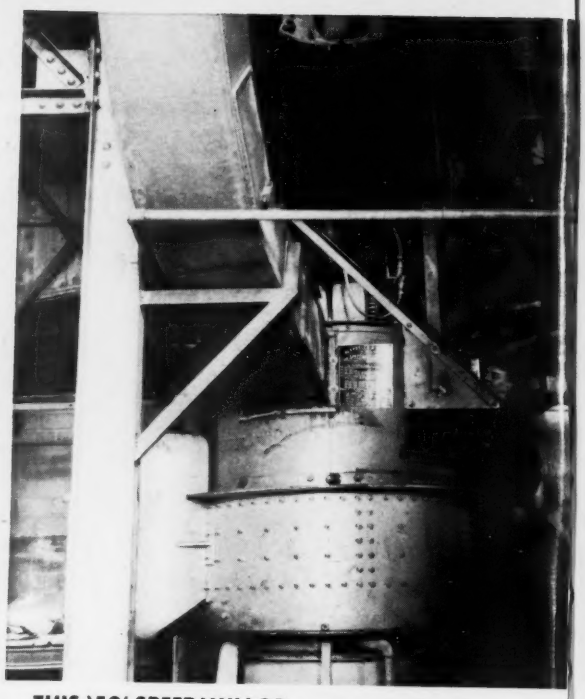
LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

B P

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
MEMBER
FEMA

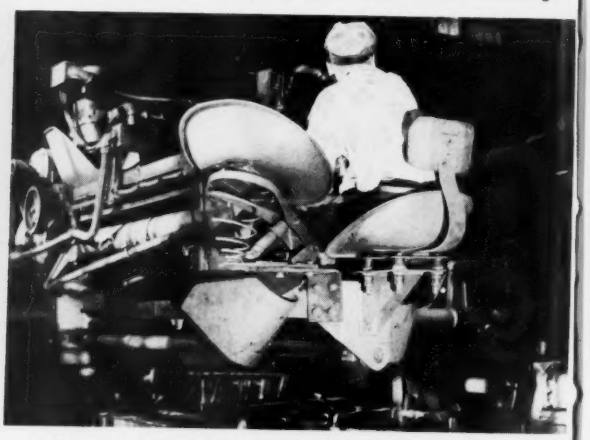


AN '80' SPEEDMULLOR mulls the foundry's molding sand. Return sand is delivered to the mullor direct from the shakeout and is very hot. Speedmullor Cooling does a real job of cooling the sand during the 1½ minute mulling cycle.



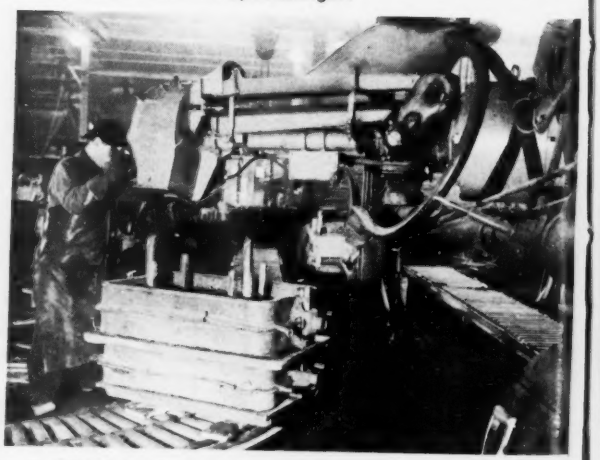
THIS '50' SPEEDMULLOR prepares the foundry's core sand and facing sand mixtures. A traveling weigh hopper above the mullor delivers the batch of sand to be mulled to the mullor. Since hot reclaimed sand is mulled this '50' is also equipped with Speedmullor Cooling.

CASTING RANGE 1 lb. to 6500 lbs. REQUIREMENTS top flexibility and economy



ONLY A STATIONARY SPEEDSLINGER could handle Fahralloy's large work as efficiently as it is done. A B&P Rotofeed provides a smooth stream of Speedmullor mulled sand to the Speedslinger.

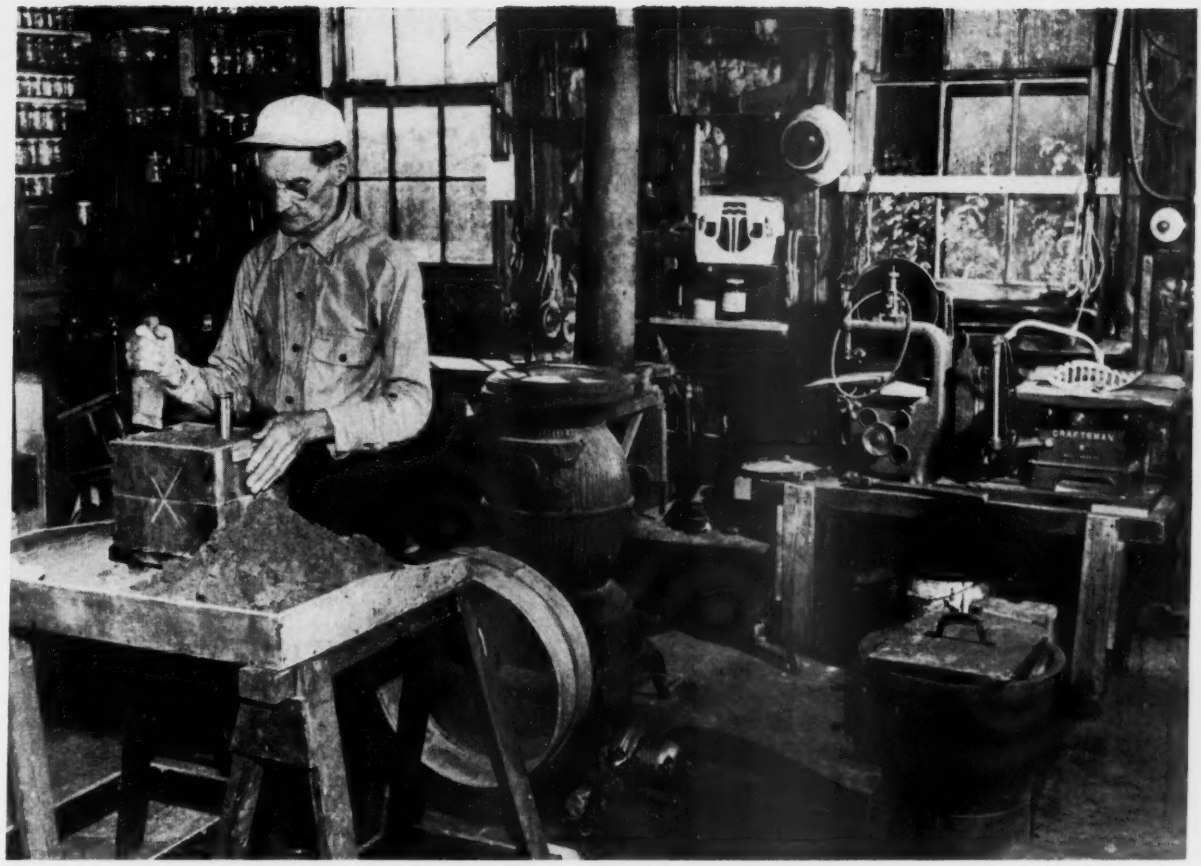
Producing steel castings of every size and type is the business of Fahralloy Ltd. at Orillia, Ontario, and to do the job right this foundry needs equipment with top flexibility. For the class of work produced, high quality is essential and, for today's competitive market, economy is a most important factor. Fahralloy has found from experience that Speedmullors, Sandslingers and Speedslingers meet all of their requirements. The Sandslinger and Speedslinger provide flexibility for handling a wide range of different patterns efficiently. With slinger ramming, castings are truer-to-pattern, and labor costs are held to a minimum. An '80' Speedmullor prepares all of the foundry's molding sand, while a '50' Speedmullor thoroughly mulls facing and core sand mixtures. Top capacity of fully mulled sand is assured, and with Speedmullors, maintenance costs are minimized. Your foundry can benefit, too . . . write *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*



A SANDSLINGER — ROLLER CONVEYOR SETUP handles many of the foundry's medium size jobs. The slinger provides flexibility for handling a wide range of different jobs without any downtime for pattern changes. It too is supplied with Speedmulled molding sand by a B&P Rotofeed.

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA



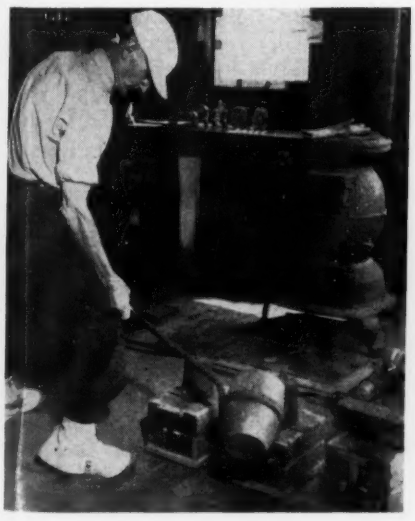
John Brown, retired employee of American Brake Shoe Co., Mahwah, N. J., packs sand to form a mold in a homemade flask in his foundry workshop. Note furnace at right

ONE-MAN FOUNDRY . . .

"Competes" with Brake Shoe Plant

ABOUT a mile from the Mahwah, N. J., plant of the American Brake Shoe Co., on the banks of the Ramapo River, stands a small foundry that is making some of the finest brake shoes in the industry. It's a small foundry as foundries go—employing only one patternmaker, one coremaker, one molder, one pourer and one grinder—but it already has a long string of satisfied customers and seems destined to gain many more.

The Mahwah plant isn't too concerned with the competition however. The foundry is owned and operated by John Brown, a retired general foreman from Mahwah, who runs the one-man foundry as a hobby in a garage behind his home at 6 Maple Ave., Suffern, N. Y. Since his retirement in 1947, John decided to turn his 54 years of experience as a foundryman to some practical use, and subsequently set up the production line in his workshop, a garage which

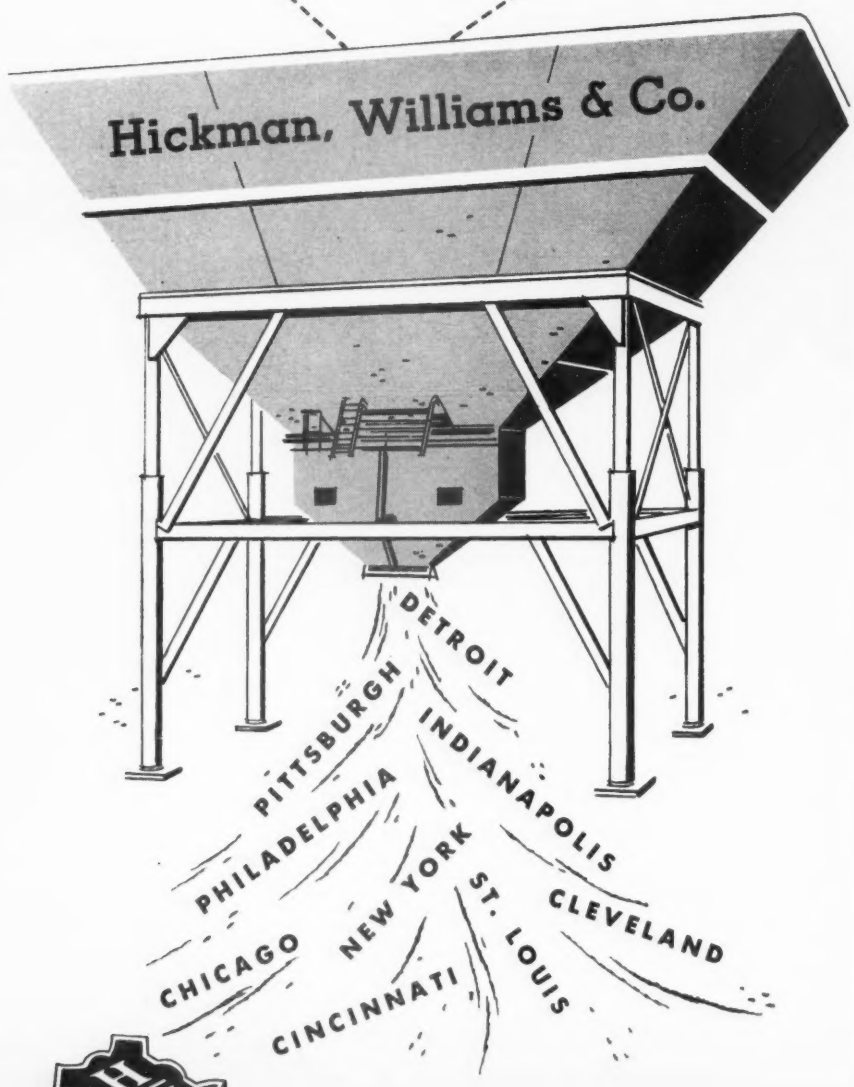


Protected by safety leggings, John Brown pours a pint-sized brake shoe

Aluminum brake shoes in center are exact duplicates of those made by American Brake Shoe Co. Other castings include book ends, ashtrays and shields

ONE CALL GETS THEM ALL!

"T" Abrasives • "INDIANAPOLIS" Coke • "JISCO"
"VICTOR" Ferrophosphorus • "CRYSTAL" Fluorspar
"PORT COLBORNE" Pig Iron • "BONDACTOR"
"WOODWARD" Pig Iron • "ALGOMA" Pig Iron
"SAJCO" Jackets • "MINERVA" Fluorite
"PERMABRASIVE"
"DOLOMITE"
Sands



Hickman, Williams & Co.
(INCORPORATED)

incidentally he built in 1925. He's always had a knack for making and repairing things and therefore had all the equipment and tools he needed. A small furnace made from an old pot stove serves as a cupola, with a vacuum cleaner motor furnishing the air blasts.

John makes his patterns from various pieces of lumber and by collecting odd hunks of metal, he has enough material to make a wide variety of castings. His foundry in miniature is completely equipped right down to safety leggings, safety goggles and gauntlets. "The only thing I don't have is a time clock," he adds.

At the moment brake shoes are his specialty. These are exact duplicates of the commercial brake shoes made at Mahwah, except they are made of aluminum and are only about one-fifth the size. But he also makes a large variety of other cast-metal objects (see cut) in small quantities.

It takes John about an hour and a half to make one brake shoe from pattern to finished shoe. Although he has had many offers from people both inside and outside Brake Shoe company to buy these in quantity for use as ornaments or paper weights, John refuses to accept payment for them, but gives them free to friends.

"If I charge for them," he says, "I'd be so worried they weren't perfect, that I wouldn't enjoy making them. This way, as long as they're free, no one can complain."

Reprinted from *Brake Shoe News*, American Brake Shoe Co., New York.

Molybdenum Production Hits Record Rate

Production rate at the Climax, Colo., molybdenum mine of the Climax Molybdenum Co. has reached 27,000 tons of ore a day, a new record for an underground mine of any kind on this continent. Molybdenum is used chiefly to harden and toughen automotive steels and cast iron, but also as an essential alloy for hardening armor plate and gun barrels and for resisting the high temperatures of jet engines.

The new expansion has ended three years of world scarcity of the metal, and the government has lifted export quotas, although export licenses still must be obtained for every shipment for security reasons. The Climax ore body is the largest primary source of molybdenum in the world. This year it will produce about 42½ million lb of the free world production of over 65 million lb. Russian production is estimated to be approximately one-fortieth of that amount.

every study shows a handling saving

80 TONS OF SUGAR PER DAY

SAVES $30 ON EVERY CAR UNLOADED

RETURNS 84% OF ITS COST

AMERICAN MONORAIL
Engineered Application
80 Tons of Sugar Per Day Distributed on MonoRail
AMERICAN MONORAIL
Engineered Application
Saves $30.00 on Every Car Unloaded
AMERICAN MONORAIL
Engineered Application
MonoRail Installation Returns 84% of Its Cost In One Year

Many companies are checking their handling problems against the American MonoRail Case Study File of "Engineered Applications." The file contains a series of case studies taken from many successful American MonoRail installations. One company saved $30.00 on every car unloaded. Another doubled metal finish production. A glass plant moved 22 tons of glass batch per hour. Another installation returned 84% of its cost in one year. These are just a few of the many studies covered.

If you want to lower your handling costs, speed up production and cut maintenance overhead, let us send you this file. Just drop us a line on your business letterhead, asking for "Engineered Applications File F-1."

AMERICAN
OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13104 ATHENS AVENUE • CLEVELAND 7, OHIO

OBITUARY

NEIL E. SALSICH, 70, vice president and a director, the Jeffrey Mfg. Co., Columbus, O., died Feb. 2. Mr. Salsich attended Beloit College and for 28 years was associated with Pennsylvania Steel Co., Steelton, Pa., and Bethlehem Steel Co., Bethlehem, Pa. The latter acquired Pennsylvania Steel Co. He joined Jeffrey Mfg. Co. in 1931.

* * *

Thomas R. Heyward Jr., for the past two years, chairman of the board, the Duraloy Co., Scottdale, Pa., died Feb. 1. Mr. Heyward founded the company in 1934 and served as its president for many years.

* * *

Adolph Wendt, 72, former foundry superintendent, Fuller-Warren Co., Milwaukee, died Jan. 31. For 32 years Mr. Wendt was associated with the stove works, which discontinued business about 1938.

* * *

Mabel E. Kissinger, former office manager and purchasing agent, Spring City Foundry Co., Spring City, Pa., died Jan. 17 in Reading, Pa. Miss Kissinger had been associated with the company for 30 years until she retired in July.

* * *

D. B. Stokes, 68, until his retirement in 1952, vice president-sales, United States Pipe & Foundry Co., Burlington, N. J., died Jan. 17. Mr. Stokes was associated with the company over 42 years.

* * *

Paul V. Wheeler, Cleveland district manager, Link-Belt Co., Chicago, died Jan. 20. Mr. Wheeler joined the company's Pittsburgh office in 1906 as a sales engineer and in 1913 was transferred to Cleveland to handle district sales there.

* * *

Joseph Hausfeld, 86, a founder of the Campbell-Hausfield Co., Harrison, O., died Jan. 5. Mr. Hausfeld started the foundry in 1916 and it is now owned by his son. In 1892 he helped organize Ohio Pattern Works & Foundry Co., Cincinnati, which he sold in 1946.

Nathan L. Munro, 61, president, Munro-Van Helms Co., Talladega, Ala., died Jan. 12. Mr. Munro helped to organize the iron foundry 8 years ago. It now has five foundries operating in Alabama.

* * *

Jerome J. Plow, 59, president, Whitehall Metal Studios Inc., Chicago, died recently. Mr. Plow helped organize the company 15 years ago. It operates a foundry in Montague, Mich.

* * *

Allen G. Pike, 50, sales representative, Texas Electric Steel Casting Co., Houston, Tex., died Jan. 3. Prior to joining the company in 1946, Mr. Pike was with the War Production Board, Washington.

* * *

Edward J. Corcoran, assistant foundry superintendent, North & Judd Mfg. Co., New Britain, Conn. died Jan. 22, as the result of an automobile accident.

* * *

A. Hard, foundry superintendent, St. Louis Steel Casting Co., St. Louis, died Jan. 9.

ATOMIC AGE SAFETY: Harmless radioactive wristbands protect hands of a mechanic from safety as he operates a punch press at United Air Lines San Francisco maintenance base. Three Geiger tubes, one hidden by the operator's left arm, the other two circled, respond instantly to the wristband radiation if his hands enter the danger zone. The unit can stop the punch even in midstroke. As an additional safety measure, the punch press will run only if the operator is wearing the wristbands. Hazatrol Inc., Berkeley, Calif., designed the safety device for United

British Foundrymen Plan 50th Year Program

The Institute of British Foundrymen will complete the first 50 years of its existence on Apr. 9. Founded in Birmingham, England, in 1904 by a small group of enthusiasts, the organization will note its anniversary with a four-point program.

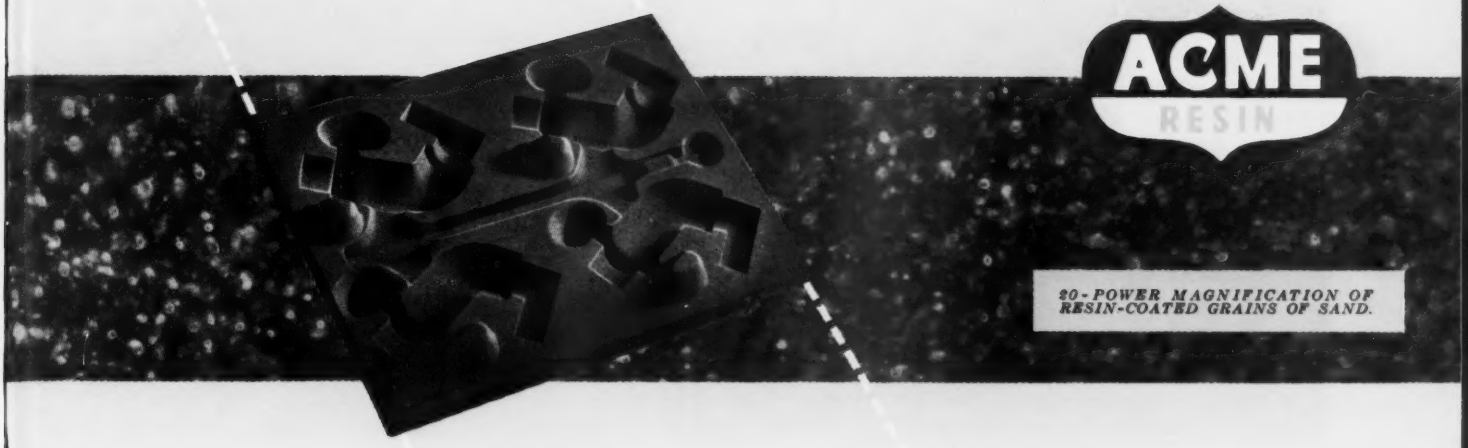
A history of the institute has been compiled by the secretary, Tom Makemson, and will be sent to all members with the March issue of the group's *Journal.* It is hoped that this history will enable members to gain a wider appreciation of the institute's achievements and development than they could by following the record of its achievements on a piecemeal, day-to-day basis.

Complementing the history, V. C. Faulkner and S. H. Russell, past presidents, will deliver the jubilee lecture on "The Development of the Foundry Industry during the Past Fifty Years" at a jubilee meeting to be held at the Cafe Royal, London, Friday afternoon, Apr. 9.

As the third point, the council of the institute has organized a short paper competition open to junior members. The jubilee award will be presented to the winner of the competition at the jubilee meeting.

Completing the day, a jubilee banquet will be held at the Cafe Royal at 7 p.m., Apr. 9.

PROVED SAVINGS



20-POWER MAGNIFICATION OF RESIN-COATED GRAINS OF SAND.

PlastiSand PROCESS

Resin formulation and the coating process covered by Patents Pending

PLASTISAND IS A REVOLUTIONARY PROCESS UTILIZING LIQUID-RESIN COATED SAND IN FOUNDRY SHELL MOLDING

Here is a totally new development by Acme Resin Corporation in a relatively new field of shell-molding. Because of its several positive advantages it overcomes the primary deterrents to the use of the more widespread "C" or shell-molding process.

Foundries using the PLASTISAND Process report PROVED SAVINGS in batch after batch of identical, superior molds with *as little as one-half* the resin content formerly necessary with dry resin.

When the PLASTISAND Process is used—DUST IS ELIMINATED, another PROVED SAVINGS over the use of dry-resin and the resulting harmful dust. Elimination of dust saves both people and equipment from the many hazards it causes.

Another PROVED SAVINGS feature with the PLASTISAND Process is the shorter dwell and faster cure—from a shorter time on the pattern and a faster baking cycle.

Acme's new process is adaptable to dump box, roll-over and blowing of either shells or cores. It uses either hot or cold mulling—in both, ACME liquid resin is used.

PLASTISAND ADDS UP TO PROVED SAVINGS!

Here is a quick check list of some of the other features of the PLASTISAND Process:

SUPERIOR TENSILE STRENGTH—PLASTISAND molds have much greater cold strength, a factor gaining importance as new stack pouring techniques are developed.

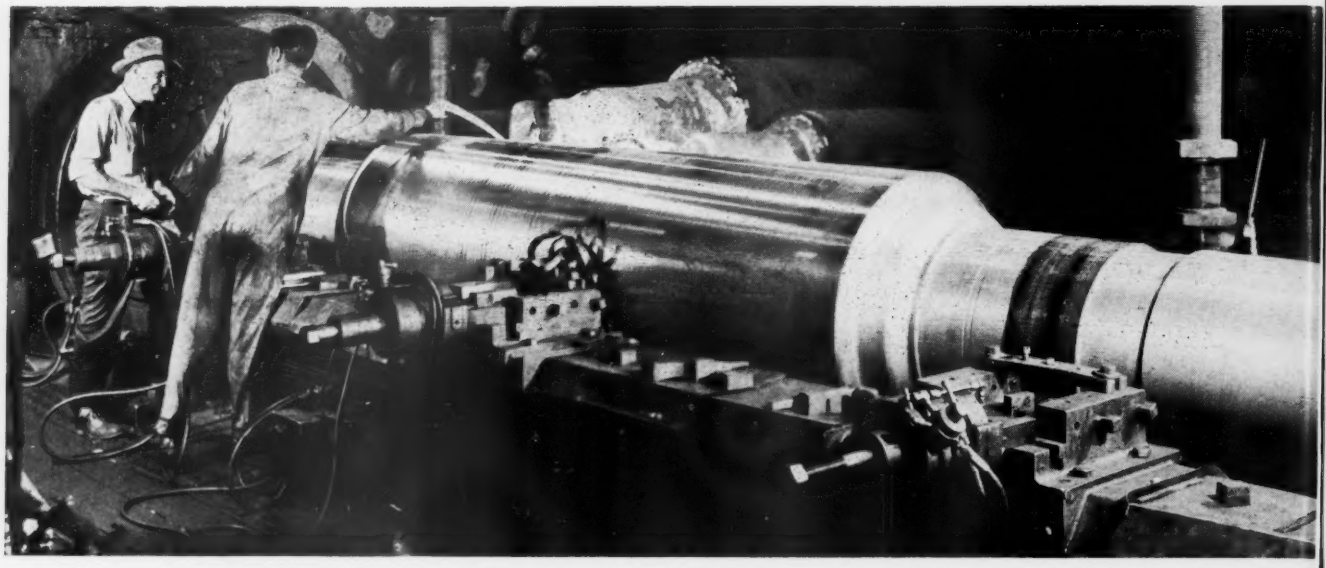
NON-SEGREGATING—Each grain of sand is completely and uniformly coated with liquid phenolic resin in the PLASTISAND Process—segregation cannot occur.

EXCELLENT HOT STRENGTH—The hot strength of PLASTISAND molds is equal or superior to that obtained by the use of dry-resin sand mixes.

GREATER PRODUCT UNIFORMITY—Because it is non-segregating, resin-coated sand prepared by the PLASTISAND Process yields almost identical molds, batch after batch.

An informative folder has been prepared to better acquaint the foundry industry with the new PLASTISAND Process. It may be obtained by writing to the ACME RESIN CORPORATION at the address listed below right.

ACME RESIN CORPORATION
1401 CIRCLE AVENUE • FOREST PARK, ILLINOIS



View of Lewis hydraulic roll lathe machining a large plate mill roll

Roll Maker Modernizes Foundries

By ROBERT M. LOVE
Pittsburgh Editor

BLAW-KNOX CO., Pittsburgh, set out to modernize its Pittsburgh foundries and plants three years ago. Now, sizing up results in the Pittsburgh and Lewis rolls departments and the Union Steel Castings Division, company officials admit they have virtually built two new plants.

Top quality of product and time savings are achieved by the roll casting division of Blaw-Knox following completion of this program. New facilities are used for manufacture of cast iron rolls by the Lewis Rolls department and cast iron and steel rolls by the Pittsburgh Rolls department. Blaw-Knox transferred its steel roll manufacturing operations to its 62nd Street plant, where more modernization took place.

"We stress quality," explains P. M. Fleming, vice president and plant manager of the Rolls Division, commenting on reasons for expansion. "In this highly-competitive field you must remain abreast of new developments or fall by the wayside."

"Three years ago," Mr. Fleming continues, "we knew we could do a better job of rollmaking by organizing our production, centralizing the maintenance shops, introducing ultrasonic testing of rolls and investing in new furnaces and other foundry equipment."

Blaw-Knox's cast iron roll plant now contains a completely new layout stressing efficient material and product flow. Coal and coke handling and storage problems are solved by a completely mechanized system using silos, elevators and feed screws. Blaw-Knox installed three modern top-charged air furnaces of 20, 30 and 36-ton capacities in this plant. Other new melting facilities in the foundry include a new 12-ton-per-hour cupola with mechanical charging equipment.

Among improvements in the cast iron foundry are a new mechanized sand handling system, storage and reclamation system, a sandslinger and eight recirculating mold drying ovens. To install the new melting and foundry equipment, Blaw-Knox had to take out two open-hearth furnaces, three air furnaces and one cupola.

Pouring an iron roll

Further improvements center in the plant's roll machining section. There Blaw-Knox centralized its maintenance department and established separate bays for machining small, medium and heavy rolls. Shipping areas were rearranged so that all production would move toward the shipping point.

Fully 74 per cent of machining facilities in the Pittsburgh and Lewis rolls plants are new or have been rebuilt or relocated. New machines include a 36-in. roll grinder, a 50-in. Lewis fully hydraulic roll lathe, a two-spindle heavy duty milling machine and an abrasive cut-off machine for removing heads of rolls.

Blaw-Knox transferred steel roll operations to its 62nd street foundry. There the firm erected a new building to house roll cleaning, annealing, machining, grinding and shipping facilities. A bay in the original foundry was turned over to steel roll molding and casting. The new roll shop building was also equipped with 12 box-type annealing furnaces and one pit-type furnace. New machining facilities include a 60-in. roll grinder, a single spindle heavy duty milling machine and a 60-in. fully hydraulic Lewis roll lathe.

Consistent with Blaw-Knox's em-

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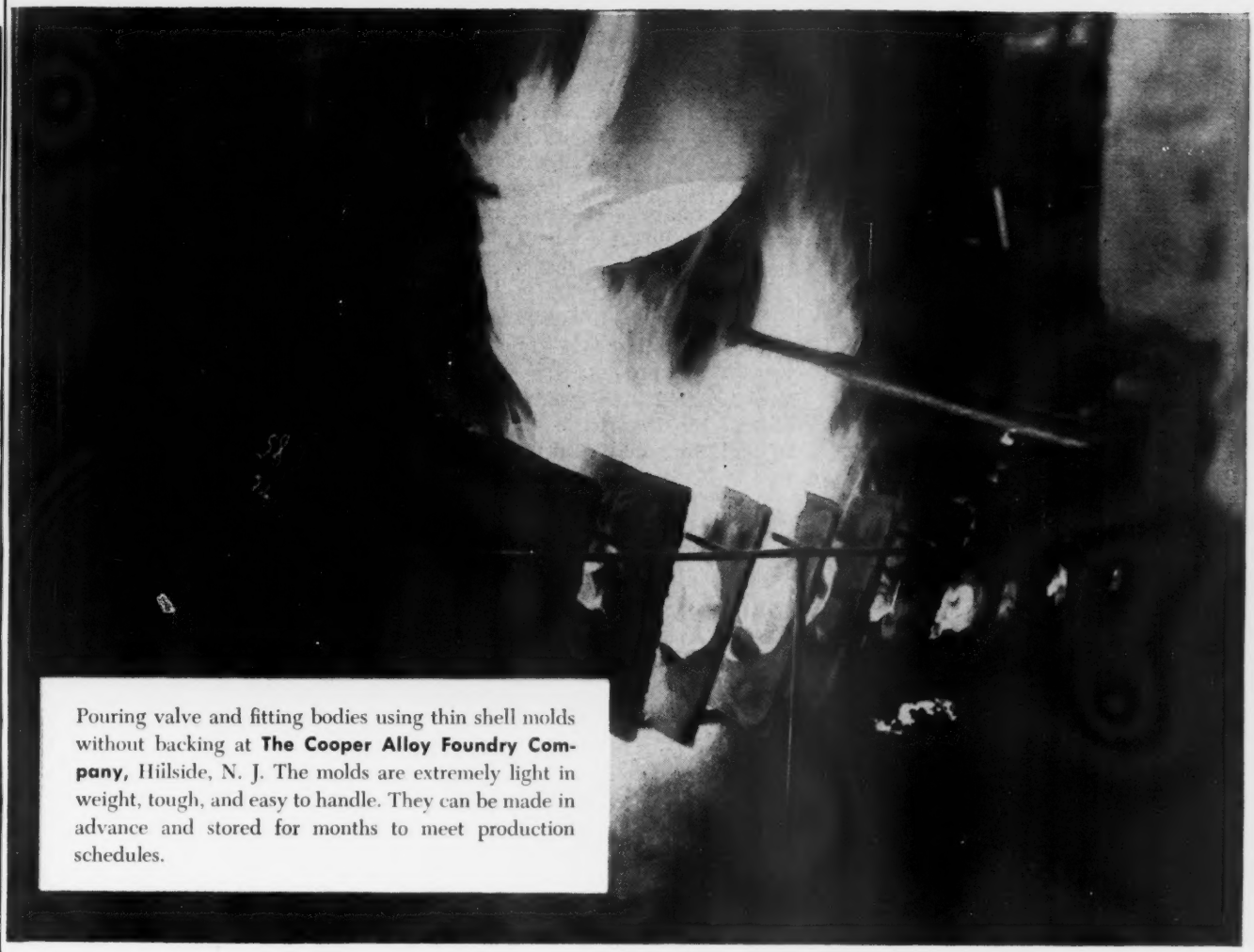

Pouring valve and fitting bodies using thin shell molds without backing at **The Cooper Alloy Foundry Company,** Hillside, N. J. The molds are extremely light in weight, tough, and easy to handle. They can be made in advance and stored for months to meet production schedules.

EVEN TWO-YEAR-OLD SHELL MOLDS YIELD PERFECT CASTINGS

Shell molds can be used after months of storage — even after two years. That's how they help make foundry operations more flexible — and faster — at The Cooper Alloy Foundry Company. They can be made in quantity for certain items and used as needed. Their castings are as good as those from molds only a few minutes old.

Successful shell molding begins with successful mold-making. BAKELITE Phenolic Resin BR-12011S has been especially developed for bonding the fine-grained sands that make up a shell mold. It speeds mold-making, since molds reach minimum usable strength faster. They retain their strength longer while curing, giving more leeway in curing time. They resist distortion on ejection from the pattern plate, so mold halves are matched more closely—and castings are more accurate. For details on how BR-12011S works, mail the coupon now.

BAKELITE COMPANY, Dept. TV-29
A Division of Union Carbide and Carbon Corporation UCC
30 East 42nd Street, New York 17, N. Y.
Please send me complete information on shell molding resin BR-12011S, together with the basic story of shell molding with BAKELITE Phenolic Resins.

*Name*_____ *Title*_____

*Company*_____

*Street*_____ *City*_____ *State*_____

BAKELITE
TRADE-MARK
PHENOLIC RESINS FOR SHELL MOLDING

TRADE MARK
BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
UCC
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In Canada: Bakelite Company
Division of Union Carbide Canada Limited
Belleville, Ontario

(*Concluded from page* 246)

phasis on quality production, the firm built a new metallurgical laboratory designed specifically for roll metallurgy. A roll research metallurgist is in charge of laboratory operations and also co-ordinates research work with current customer needs.

Furnace Manufacturers Stress Modernization

Modernization was the theme of the annual meeting of the Industrial Furnace Manufacturers Association held in Philadelphia, Jan. 25-26. The association also plans to emphasize that theme in its activities this year. Members were urged to sell the advantages of the improved furnaces and combustion equipment available to the industry today.

L. H. Gillette, manager, industrial heating sales, Westinghouse Electric Corp., was elected president and director of the association for 1954. He succeeds Curt H. Vaughan, sales manager, the Electric Furnace Co., Salem, O., who was elected a member of the executive committee.

Carl L. Ipsen was re-elected executive vice-president. Ralph E. Whittaker, secretary, Swindell-Dressler Corp., Pittsburgh, was re-elected treasurer.

New directors are Horace Drever, president, the Drever Co., Philadelphia, and Norman H. Davies, president, the North American Mfg. Co., Cleveland. Directors whose term continues are: L. A. Shea, general sales manager, Lindberg Engineering Co., Chicago; A. L. Hollinger, manager, Steel Mill Division, Surface Combustion Corp., Toledo; J. J. Walker, vice-president and general manager, C. I. Hayes Inc., Providence, R. I.; William Adam Jr., executive vice president, Ajax Electric Co. Inc., Philadelphia; Ralph E. Whittaker; and C. H. Vaughan.

"Probably 45 per cent of the industrial heating equipment in this country is over 10 years old," Dr. Dexter M. Keezer, vice president and director of economic staff, McGraw Hill Publishing Co., a major speaker at the meeting, said. "At least 25 per cent is over 20 years old."

Russian industry has a much higher proportion of modern equipment than American industry, according to Dr. Keezer. The average age of

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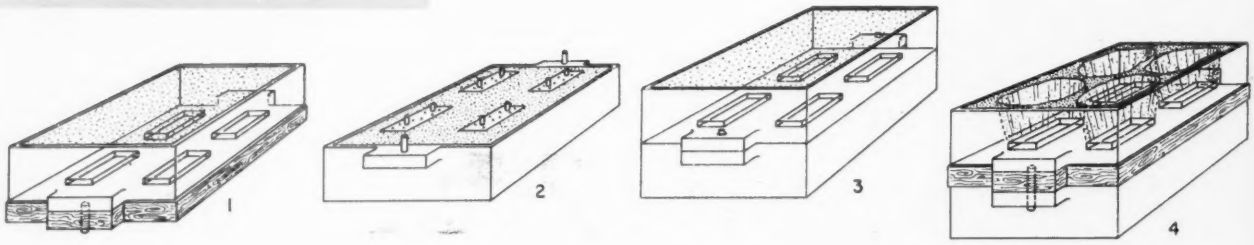
How To Do It . . .



Mounting of Loose Patterns on Squeezer Board Is Simplified

A JOBBING FOUNDRY often has several small, split loose patterns, with flat mating surfaces, from which castings previously have been ordered in small lots, possibly one to five each. When orders increase to larger runs, it would pay to change from loose pattern work to mounted patterns for use on squeezer machines. It is possible to fasten such patterns to a squeezer board at the molder's bench with a few simple tools and a ready-made pattern board equipped with guide pins in the ears.

The board is placed in position between two squeezer flasks of the proper size and the pattern halves, containing projecting dowel pins, are arranged on the board inside one of the flasks. Ends of the dowel pins are coated with chalk dust or paint to mark their position on the board. Holes of a size to permit a slip fit for the dowels but not large enough to allow shifting of the pattern halves are drilled in the board at the indicated points.

Brads are driven into all pattern halves in such a manner that the points barely show on the mating faces of the patterns. Halves with the projecting dowels then are placed on the pattern board with the dowels in the drilled holes (Fig. 1). Sand is rammed hard around the pattern, struck off, a bottom board placed in position and the mold rolled over. The empty flask, now on top, and the pattern board are removed (Fig. 2).

Remaining pattern halves with nails inserted as described previously are placed in position on the pattern halves embedded in the sand. The mold joint is troweled and slicked and sprinkled with parting powder. The empty flask is set in position (Fig. 3), the mold rammed and struck off.

The top half of the mold is removed with the half patterns in position. Then the pattern board is replaced with the drilled holes fitting over the dowel pins in the lower half mold. Next, the top half of the mold, containing its pattern halves, is set on the pattern board.

Sand is dug away gently and carefully (Fig. 4) to find top of patterns and projecting brads; brads are driven home with a nail punch and hammer and the patterns re-covered with sand. A bottom board is placed on top of the mold and the whole mold rolled over. Bottom board is removed from the other mold half, sand dug away from tops of the patterns and the brads driven home as before.

When the mold is shaken out, cope and drag patterns will be positioned correctly on the squeezer board. Necessary gates and risers then are fashioned from soft wood and nailed into place on the board.

Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

Coming in May

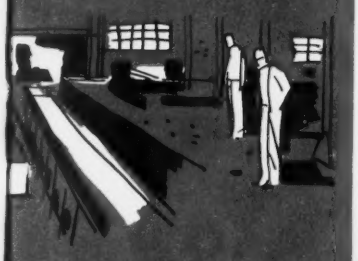
FOUNDRY's 58th PRE-CONVENTION ISSUE

FEATURING 3 SPECIAL REPORTS ON

FOUNDRY EQUIPMENT and MECHANIZATION

☆ 1954 Inventory of Foundry Equipment

Want to compare the age and volume of your equipment with other foundries? A special study of this subject will be completed just before FOUNDRY's Pre-Convention issue goes to press. It will indicate the types of equipment foundrymen think they will buy, will report the volume and age of over 50 major types of foundry equipment—as they occur in small, medium and large foundries.



☆ How to Plan for Foundry Mechanization

Shall we mechanize? Why? When? How? Suggestions and answers will be given with the interests in mind of small to large foundries. This special report will be a down-to-earth discussion by practical men and their associates—based on experiences and observations solving production problems over many years.

☆ Foundry Equipment for the Small Foundry

How do "small foundries" fare in the equipment market? Is it true they are the "forgotten men" of our great industry? The Editors don't think so and will present a comprehensive, illustrated display of equipment believed to be within the reach of, and well-suited to the needs of the "less than 50 employees" foundries.

58th ANNUAL FOUNDRY CONVENTION
Cleveland, May 8 to 14, 1954

The May Pre-Convention Issue will be mailed one week earlier than usual to reach readers well in advance of the opening of the Convention.

MAY PRE-CONVENTION ISSUE

FEATURING . . .

3 Special Reports on
FOUNDRY EQUIPMENT AND MECHANIZATION

- 1954 Inventory of Foundry Equipment.
- How to plan for Foundry Mechanization.
- Foundry Equipment for the Small Foundry.

PREVIEW of the
1954 Convention and Exhibit

Program of Technical Sessions.
Convention Activities.
Committee Personnel.

JUNE POST-CONVENTION ISSUE

REPORTING THE CONVENTION

Editorial news and picture reports on the convention and technical sessions.

ALL REGULAR EDITORIAL FEATURES

FOUNDRY A PENTON PUBLICATION • PENTON BUILDING • CLEVELAND 13, OHIO

(*Concluded from page* 248)

American equipment is about what it was ten years ago, he said.

IFMA members were urged by John C. Patterson, New York public relations counsel, to gather more case examples of outstanding furnace installations to dramatize the advantages of the new technology in industrial heating.

L. H. GILLETTE

"Progress in industrial heating has been much greater than most manufacturers and engineers realize," he said. "There is no better way to drive that fact home than with case examples."

Work is under way on a "dictionary" of furnace and heating terms and definitions to be published by the association. R. L. Harper, executive vice-president, Harper Electric Furnace Corp., Buffalo, is chairman of a committee in charge of the project.

It was reported that orders received by member companies during 1953 were 89½ per cent of 1952 orders and 226 per cent of average of orders received in 1945-46-47.

Sales Contest Prize Goes to Veterans Hospital

A clock radio offered by Branford Co., pneumatic vibrator manufacturer of New Haven, Conn., as one of the prizes in a sales contest arrived at an unexpected destination recently when the winner asked that it be donated to a U. S. veterans hospital.

The prize was won by Canadian Foundry Supplies & Equipment Co., Toronto, Ont., Canada, which showed the greatest increase in sales for the period of the contest. Complying with the company's request, Branford Co. sent the prize to the State of Connecticut Veterans Hospital at Rocky Hill. Conn.

BIG PUSH FOR PROFITS

Up a steel ramp with a full load of roofing material at Alamo Iron Works, San Antonio, Texas.

With production costs up in every industry, it's *drive, drive, drive* every inch of the way to maintain profits. Many firms are doing it by slashing their materials handling costs with Towmotor **M**ass **H**andling Equipment. Towmotor Fork Lift Trucks speed production, stop manhour leakage, increase capacity. Join the big push for profits with Towmotor Equipment!

Write for "What Makes It Tick?," the inside story of Towmotor. Towmotor Corporation, Division 7503, 1226 E. 152nd St., Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS and TRACTORS
Since 1919
TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

ROBERT E. KENNEDY SCHOLARSHIP FUND

Established by Chicago Chapter, AFS

By ERLE F. ROSS
Chicago Editor

CHICAGO Chapter of the American Foundrymen's Society has established at the Chicago Undergraduate Division of the University of Illinois the Robert E. Kennedy Scholarship Fund as a tribute to and an expression of affection for its long-time member who has devoted his life to educational aspects of the foundry industry.

Last June Mr. Kennedy retired as associate professor in charge of the school's foundry and pattern laboratory, which he helped to set up when the Navy Pier Branch of the University was established in 1946.

The scholarship fund was announced at the monthly meeting of the Chicago Chapter on Feb. 2. At that time Chapter President John A. Rassenfoss presented to Associate Dean of Engineering F. W. Trezise a check for $5000, a bronze plaque and a copy of the trust agreement.

President Rassenfoss, assistant director of research, American Steel Foundries, East Chicago, Ind., stated that the chapter was establishing the scholarship "because of the enthusiasm and devotion with which Bob Kennedy has served the foundry industry through the AFS and through his years of teaching and inspiring leadership of 'his boys,' the chapter is honored to provide this scholarship."

Explaining further, he said: "The scholarship will be available annually, providing tuition and fees to the student selected for this honor on the basis of character, ability, interest in work related to the foundry industry, and financial need."

Dean Trezise paid a high tribute to Mr. Kennedy and in accepting the check said it would be placed in the university's endowment fund and used as directed.

The formal agreement stipulates "an initial sum of $5000 shall be given to the University by the Chicago Chapter, AFS, to which subsequent additions may be made. These gifts shall be held as an endowment fund and invested in the manner that the Board of Trustees of the University shall determine.

"The income from the fund shall be used for undergraduate scholarships. . . .as provided. The amount of the scholarships shall be determined by the University in each individual case. The proceeds of this fund shall be used to defray the necessary educational expenses of the scholarship winner. Funds not used for specific educational purposes will be given to the student upon satisfactory completion of his year's work."

The plaque was executed by Edward Everett Burr of the university's art department. It is cast in bronze in duplicate. One will be in possession of the university and the other will be retained by the Chicago Chapter. Students who are recipients of scholarships will receive a medallion bearing the plaque design.

Details of the scholarship fund were worked out by a chapter committee headed by W. D. McMillan, metallurgical supervisor, International Harvester Co.; J. T. Moore, office manager, Wells Mfg. Co.; W. W Moore, vice president and works manager, Burnside Steel Foundry Co.; C. V. Nass, vice president, Pettibone Mulliken Corp.; F. L. Riddell, plant metallurgist, H. Kramer & Co.; R. P. Schauss, Chicago district sales manager, Werner G. Smith Inc., and R. W. Schroeder, associate professor, foundry and pattern laboratory, University of Illinois, Navy Pier Branch.

Establishes Foundry Course

The Chicago Undergraduate Division of the University of Illinois was established in the fall of 1946 when after the end of World War II the university at Urbana, Ill., was forced to accommodate increased enrollment sought by war veterans. During the summer of 1946 Bob Kennedy was given the assignment of organizing and setting up the foundry and pattern course.

FOUNDRY in its issue of May, 1948, presented an article describing the course and Mr. Kennedy's part in the undertaking. The following is a direct quotation from that article:

"It was natural that he should embody in the course those aims and objectives which he had gained from long experience in the foundry field, first as an instructor in foundry practice and later on the national office staff of the American Foundrymen's Association.

"An alumnus of the University of Illinois, receiving the degree of B.S. in Vocational Education in 1925, Mr. Kennedy entered the university in Urbana, Ill., as a student in 1909. The following year he became a member of the teaching staff, a post he continued until 1924, by which time he had become assistant professor

(*Concluded on page* 255)

John A. Rassenfoss, left, Chicago Chapter president, presents scholarship fund check to F. W. Trezise, right, associate dean of engineering of the University of Illinois Chicago Undergraduate Division. Looking on is Bob Kennedy, in whose name the Chicago Chapter has established the scholarship

A LOW COST GUARANTEE OF *Better* CASTINGS

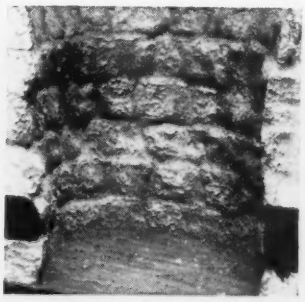
Famous CORNELL CUPOLA FLUX

- CLEANSES MOLTEN IRON
- INCREASES FLUIDITY
- GREATLY REDUCES SULPHUR

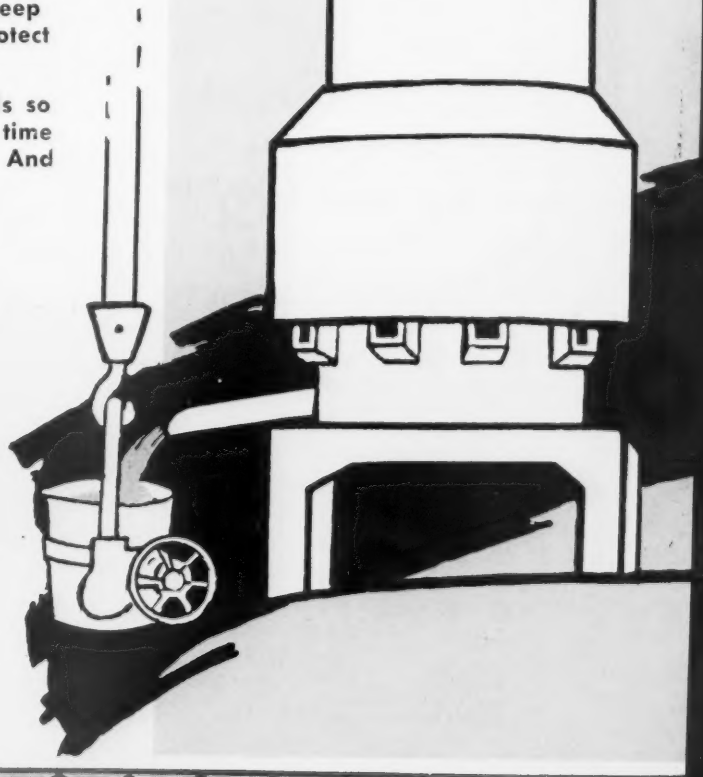
It pays to be sure that only the cleanest iron reaches your molds. That's why leading gray iron foundries and malleable foundries with cupolas say that the use of Famous Cornell Cupola Flux is a "must" to keep casting rejects at a minimum and protect their profits.

Furthermore, it costs little to buy, and is so easy to use that only a few seconds of time is required for each cupola charge. And there is no waste.

THE CUPOLA before using Famous Cornell Cupola Flux.



THE CUPOLA during use of Famous Cornell Cupola Flux.



KEEPS CUPOLAS CLEANER. REDUCES MAINTENANCE. Famous Cornell Cupola Flux greatly reduces digging out time because drops are cleaner and there is practically no bridging over. Furthermore, this flux forms a glazed or vitrified protective surface on brick or stone, reducing erosion of lining—and repairs.

WRITE FOR BULLETIN NO. 46-B

The Cleveland Flux Co.

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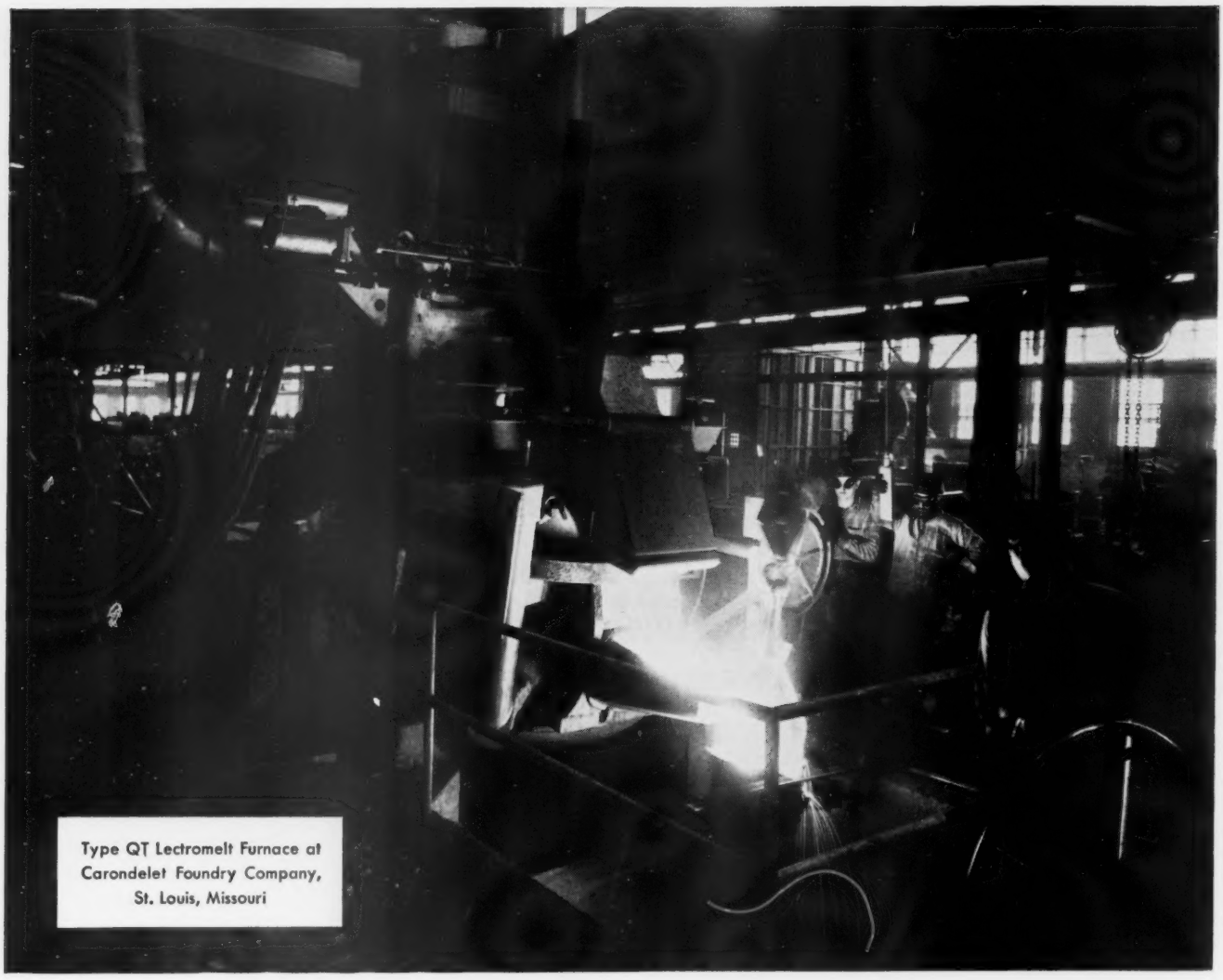
Trade Mark Registered

BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions.



Type QT Lectromelt Furnace at Carondelet Foundry Company, St. Louis, Missouri

"Our *Lectromelt** Furnace gives us the Versatility needed in our jobbing foundry"

"Top-charging doesn't give our Lectromelt Furnace much time to loaf, boosting its productive time and holding down labor costs," reports Carondelet Foundry Company.

"Its versatility lets us shift easily from one type product to another . . . from high strength gray irons for pressure castings, to special steels for heat resistance, corrosion and abrasion resistance. In 10 minutes we make a spectrographic, prepouring analysis, permitting us to adjust each heat to meet specifications.

"Our Lectromelt Furnace is new, but already it's proved its worth."

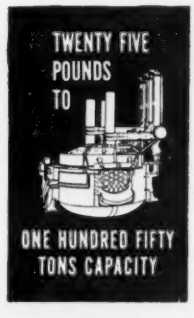
If your business involves melting, smelting, refining or reduction, it will pay you to investigate what Lectromelt Furnace Equipment will do for you. For Catalog No. 8, write: Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pa.

Manufactured In . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

*REG. T. M. U. S. PAT. OFF.



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in charge of foundry practice. Meanwhile, beginning in 1921, he had been serving as assistant secretary of the American Foundrymen's Association. Relinquishing his duties at the university in 1924, Mr. Kennedy moved to the association's national office in Chicago and assumed the position of technical secretary. In 1943, he was elected secretary and in this capacity continued to promote and encourage chapter organization.

"In 1945, in recognition of his long and faithful service in the association, the membership and the industry, Mr. Kennedy was relieved of his increasing administrative burdens and made secretary emeritus. Few men in the foundry field have merited the esteem in which Bob Kennedy is held, because of his unselfish and kindly devotion to committee work, convention programs, chapter organization, and the encouragement of young men in the industry. It was those qualities that earned for him the Joseph S. Seaman Gold Medal of the AFA, an award symbolizing 'Kindliness,' presented to him at the association's annual business meeting in 1945."

Casting Institute Study May Alter Alloy Use

Savings of nickel in alloy castings are expected to follow from research results announced by A. M. Hall, chief of the Division of Alloy Development at the Battelle Memorial Institute, Columbus, O. Sponsored by the Alloy Casting Institute, this research is counted on to stimulate broader use of a hitherto neglected alloy as a substitute for alloys containing greater amounts of nickel.

Speaking at a recent meeting of the Technical Research Committee of the Alloy Casting Institute, Mr. Hall said that the alloy, designated as the HF grade, containing approximately 20 per cent chromium and 9 per cent nickel, can effectively substitute for an alloy containing about 26 per cent chromium and 12 per cent nickel (HH grade) in the intermediate temperature range of about 1200 to 1600°F. The research shows that the mechanical properties of this alloy are comparable to those of higher-nickel heat-resistant alloys. On a pound-for-pound basis, this should mean a saving of about 25 per cent in the amount of nickel contained per casting.

Started 2½ years ago, the HF alloy research program was stimulated by the shortage of nickel, which still exists. Reduction of operating temperatures in oil refining, made possible by the recently developed catalytic cracking process, provided a demand for castings of lower nickel content than those used in conventional refining methods. At the same time increased heat treating of industrial metal parts at intermediate temperatures created a further outlet for a lean nickel alloy useful in such service.

Because design engineers are reluctant to utilize a construction material unless complete information is available about its properties, the widely known 25 per cent chromium-12 per cent nickel (HH) alloy continued to be employed. Although the HF alloy has been used to some extent the last few years, the release now of extensive data on this grade is believed likely to increase its area of application.

Trends toward higher operating temperatures in some industries, notably power plants, are pushing the low materials now used for furnace construction to their limits of usefulness. The availability of the cast HF alloy usable at temperatures above these limits will permit engineers to take advantage of the efficiency of higher-temperature operation.

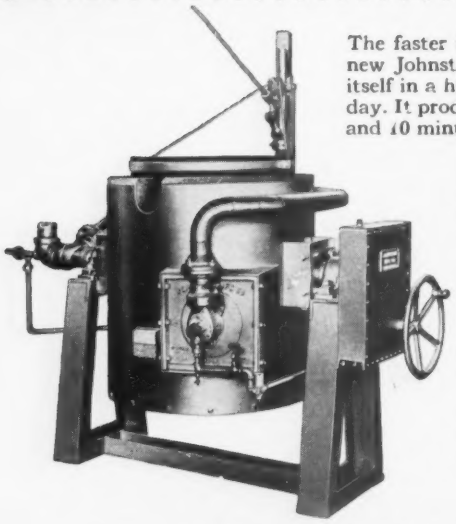
Investigating a broad series of experimental alloys, the Battelle group found that the most useful range is 19 to 23 per cent chromium, 9 to 12 per cent nickel, and 0.25 to 0.40 per cent carbon. This composition has been designated as the HF alloy type. In general, the mechanical properties of the austenitic HF compositions in the 1200 to 1600°F range are comparable to those of the higher-nickel alloys. At 1400°F, the 100-hour rupture stress (an indication of load-carrying ability of the metal at high temperatures) of a typical HF composition is about 14,000 psi. This is the same as the representative value for the higher-nickel HH grade.

After service at high temperatures, the residual room temperature mechanical properties of an alloy are important. For example, some materials become quite embrittled and thus difficult to handle in maintenance or repair operations. The HF grade, as-cast, has satisfactory ductility as shown by an average elongation value of about 30 per cent. After 24 hours' exposure at 1400°F, the elongation is approximately 17 per cent—still adequately ductile. Comparative figures for the higher-nickel HH grade are 20 per cent as-cast and 10 per cent after 24 hours at 1400°F.

HONOR 25-YEAR VETERANS: Ottawa Silica Co., Ottawa, Ill., recently honored 33 active and retired employees, including two women and President G. A. Thornton, who have served the company for 25 years or more. At a special banquet in LaSalle, Ill., the men were presented with engraved gold watches and the ladies with diamond-studded white gold watches. Vice President H. C. Thornton acted as toastmaster and introduced the guests, whose combined years of service totaled more than 1000

NEW FURNACE—

Melts 1200 Lbs. of Brass IN 1 Hour, 10 Minutes!



The faster the furnace—the lower your cost. The new Johnston No. 400 Crucible Furnace pays for itself in a hurry by hustling more heats into every day. It produces 1200 lbs. of molten brass in 1 hour and 10 minutes on successive heats, gas fired (may also be oil fired as is model shown). Johnston burners, blowers and experienced engineering combine to produce unusual speed with economically low fuel consumption.

A new enclosed tilting mechanism makes tilting easier than ever before and it may be electrically driven.

Crucible life and lining life are extremely good. Trunions are adjustable for best balance and are supported on large pillow block bearings. A simple, convenient cover lifting mechanism is operated from the front of the furnace.

WRITE FOR CATALOG 223F

OVER THIRTY YEARS EXPERIENCE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL HEATING EQUIPMENT

THE JOHNSTON LINE — SAFETY — DEPENDABILITY

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ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

NOW — safe, practical

RADIOGRAPHIC INSPECTION

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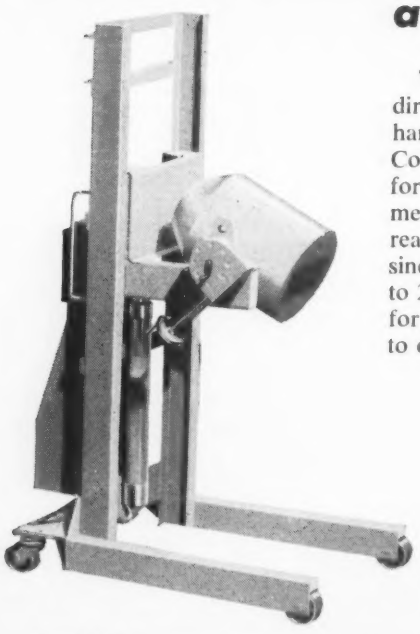

With Technical Operations' DES (a new directional exposure shield) for the *safe* handling of up to 10,000 millicuries of Cobalt 60. The DES was specifically designed for radiographic inspection of castings, weldments, assemblies, forgings, etc. It is the first real step forward in industrial radiography since X-ray. Producing radiation equivalent to 2 million volt X-ray, the DES can be used for thicknesses ranging from less than ½" to over 6" of steel, brass, bronze, etc.

SAFE — The radiographer need not leave the room during exposures.

PRACTICAL — Exposure times are cut from hours to minutes. Calculations are easy. Control of the beam is simple. Mounted on a castered lift truck.

INEXPENSIVE — Much lower cost for basic equipment (less than $4000). No expensive shielded room required. No maintenance. No tubes to replace. No circuitry to be serviced.

Send for bulletin giving specifications, construction and operation data.

TECHNICAL OPERATIONS INC.
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How a Safety Program Can Operate

By NEIL MILLER
Federal Malleable Co., West Allis, Wis.

TO BE effective a safety program must be an affirmed part of management policy. Just as most companies have specific policies toward governing various phases of production, sales, prices, costs, hours of work, vacations, etc., so there must be a specific policy on safety. Establishment of a policy on safety is a management function and responsibility.

The management policy on safety should place the responsibility for safety. Since many, if not most, malleable iron foundries are not large enough to utilize a full-time safety engineer, it is my belief that the responsibility for safety should rest with each foreman. Carrying out the management policy on safety should become a positive part of each foreman's job. His reports to management should include reports on safety in his department together with his suggestions for improving or implementing the safety program.

This and the succeeding paper received honorable mention in the safety contest conducted recently by the Malleable Founders' Society among employees of member companies. The four prize-winning papers were presented in the February issue.

There are occasions when the assistance of the employees, through the establishment of safety committees, can be utilized to assist in carrying out the policy on safety. Use of safety committees often helps employees understand the management policy on safety and the reason for some of the safety rules embodied in the policy. However, care must be taken, lest the safety committee gets "off track" and becomes a "gripe committee," in so doing failing to serve its purpose. Care must be taken, too, that the foreman understands that he is still responsible for the safety of his employees and that this responsibility cannot be "buck-passed" to the committee.

No safety program can be considered complete if it only refers to safe equipment and safe methods of operation. A third ingredient must also

(*Continued on page* 258)

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UNIFORM THICKNESS. Their smooth, clean, velvety surfaces have a close parallel tolerance of .0025.

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Mahogany and Pine Pattern Lumber

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HAUSFELD
METAL MELTING FURNACES
FOR
BRASS—ALUMINUM—MAGNESIUM
AND ALL OTHER NON-FERROUS
METALS AND ALLOYS
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TILTING AND NON-TILTING TYPES
SINGLE AND MULTIPLE BURNERS
AUTOMATIC PROPORTIONING SINGLE VALVE
CONTROL ASSURES UNIFORM RESULTS WITH
MAXIMUM ECONOMY OF OPERATION.

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Continued from page* 256)

be nurtured; namely, a "safety attitude." Unless everyone—the "big boss," the foreman and the employee—has the same attitude that safety is a "must," the best planned program will fail. It has been proved many times that no machine and no job operation can be made absolutely safe. It can be safe only as long as the machine operator is interested in safety. Maintaining interest in safety is a continuous task, a task of repetition. Not dry, routine repetition that dulls the attitude, but constantly changing publicity and materials that keep interest alive. (Here, again, a safety committee may be utilized to disseminate this material at the employee level.)

Once safety has been established as a positive company policy, and the responsibility for carrying out the policy has been placed, perhaps the most important factor in aiding the success of the policy is making the facts known. Give the supervisor the dollars and cents cost of work injuries in his department. Give it to him in terms of the pain and suffering caused when injury strikes one of his men. Bring out to the employees the cost of work injuries to them, in terms of lost wages, which are never fully compensated for under workmen's compensation.

It is my belief that when all the facts are known, one cannot help but be on the side of safety. When that happens you will have a real safety program.

•

What One Individual Can Do To Help in a Safety Program

By JOSEPH GUGLIELMINO
National Malleable & Steel Castings Co.
Cicero, Ill.

SAFETY in a foundry is essentially a one-man program multiplied by each individual worker in the plant. An accident happens as a result of what *one* man has or has not done. Every man in the foundry should be properly instructed by the personnel department in the hazards of the foundry. The foreman should instruct all new men assigned to him in the safe operation of his particular job and follow through to make sure the instructions are understood and properly followed.

After these points have been covered, it is up to each one of us to practice safety in all phases of our

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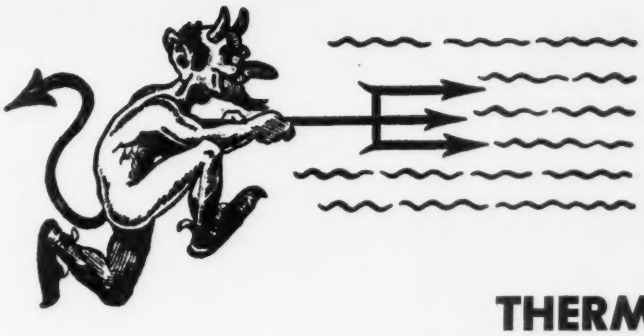

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THERMOTOMIC® COMPOUNDS and CARBON FREE LIQUIDIZERS

Keeps metal molten!

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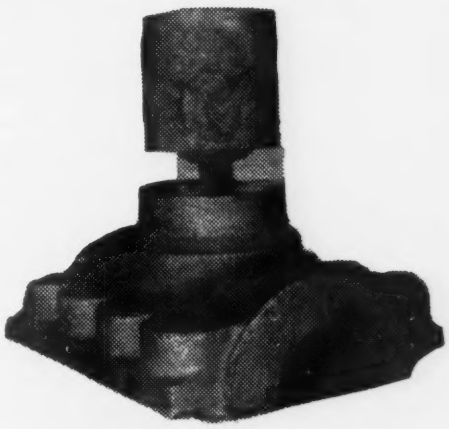
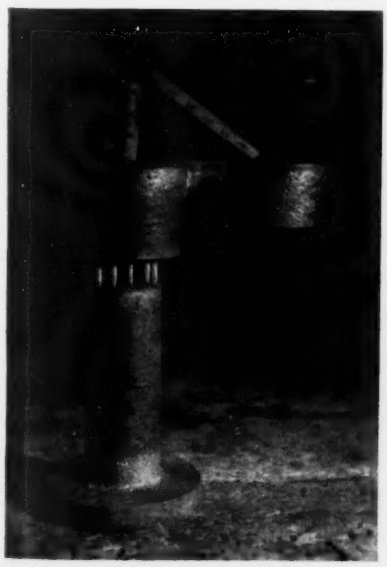
THERMOTOMIC "X" is a patented exothermic compound that produces a temperature over 3500° F. It can be molded or baked into any desired shape the same as sand cores. THERMOTOMIC "X" is used as knock off core rings with 1½ inch feeder openings under risers of feeding heads, also as insulating sleeves, inserts and facings, or mixed with facing sand where it is desired to maintain fluidity of the casting metal. Shorter and more compact heads and risers can be used. The small feeder opening permits easy removal of feeding heads and risers. In conjunction with THERMOTOMIC COMPOUNDS, we recommend the use of exothermic CARBON FREE LIQUIDIZER NO. 5 on top of the metal in the heads or risers as an insulating cover. For green sand casting molds, use THERMOTOMIC WP (Waterproof).

U. S. Patents No. 2,490,327 and No. 2,500,097



300 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.

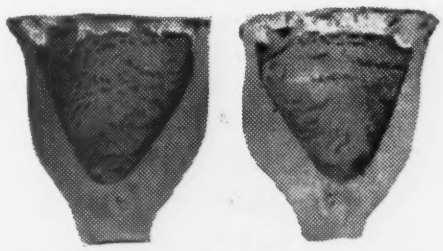


THERMOTOMIC STRAINER CORE

Produces Monel Castings 270 lbs. solid

Made by direct pouring through the Thermotomic strainer core under the feeding head.

No chills were used, no shrinkage at the flange. Note depth of shrinkage in the feeding head.



NOTE THESE TYPICAL RESULTS FROM THE USE OF SOFFEL'S CARBON FREE LIQUIDIZER

With the application of 1 pound of SOFFEL'S CARBON FREE LIQUIDIZER, this 6" x 6" chrome-nickel-steel riser was reduced in weight from 32 pounds to 13 pounds average. A savings of 19 pounds of salable metal, normally discarded as scrap, was fed into the casting and produced a heavier, sounder casting. Note the feeding head can be knocked off easily, saving burning costs. There is no better feeding head compound at any price than SOFFEL'S CARBON FREE LIQUIDIZER.

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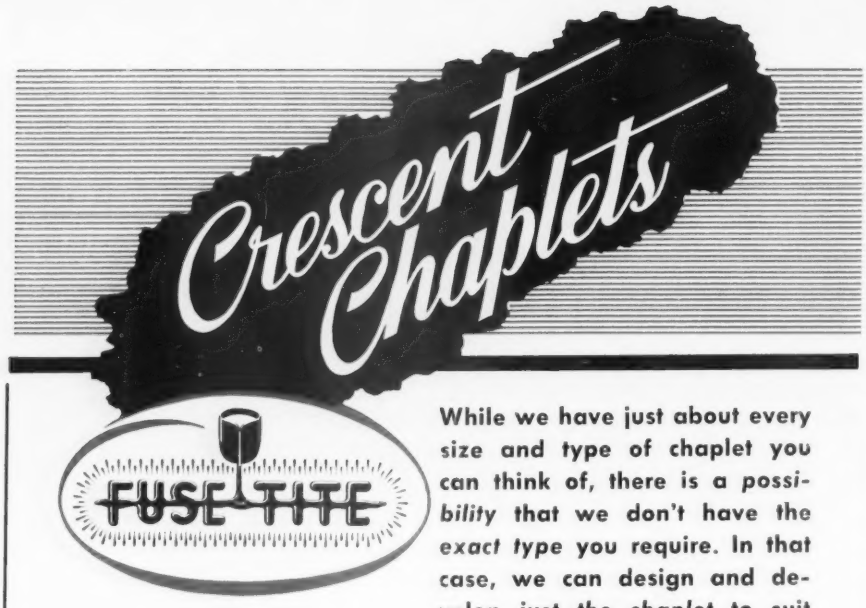

While we have just about every size and type of chaplet you can think of, there is a *possibility* that we don't have the *exact type* you require. In that case, we can design and develop *just the chaplet* to suit your requirements! We have all sorts of working samples available, and are always ready to ship them in a hurry to those who wish to try them.

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- RADIATOR CHAPLETS
- SHOULDER CHAPLETS
- BOILER CHAPLETS
- DOUBLE HEAD CHAPLETS
- MOTOR CHAPLETS
  Regular or Extended Stems
- TIN TUBES
  Plain, Nicked or Barbed
- SKIM GATES
- CORE WIRES
- CORE PLATES & SHIMS
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Crescent FUSETITE CHAPLETS are accurately made of proper analysis materials for the fusing-in process. We have been devising and supplying chaplets since 1889, and our stocks are amazingly ample and varied. We originated Radiator, Shoulder, Double Head and Motor Chaplets, and if necessary, we can originate Special Chaplets for YOU.

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(*Concluded from page* 258)

jobs. We alone can be the cause of an accident or prevent it.

All the safety equipment ever made and put into use cannot protect a man if he does not use it properly. The man must believe in the safety procedure fully. He must also realize that just one careless move or lapse of thought can result in an accident, possibly a serious one, to either him or his co-workers.

You and I as workers should not only learn to do our jobs correctly, but we should learn to do the jobs safely and by our actions lead others to work safely.

Here are some thoughts for us to keep in mind which will help to attain a safe shop to work in for everyone:

1. Follow all the safety rules that have been set up by the safety engineers. Use the mechanical safeguards and equipment that they have given us. This equipment can and does take care of any mechanical problems that may arise. Remember that no equipment can control the human element.
2. You and I, as workers in the foundry, must understand clearly all the job hazards.
3. Cleanliness of both a personal nature and of the work area MUST be practiced to the highest possible degree.
4. We should make proper use of all the safety clothing that has been given to us.
5. We must keep in mind that we are working and must forget the urge to play. There is plenty of time for play when not in the shop.
6. Remember that you or I may be the cause of a fellow worker being seriously injured.
7. Just because a particular method has become a general practice in the shop it does not mean it is a safe one. If we have any doubts as to these practices, they should be brought to the foreman's attention.
8. Primarily, management depends on us, who actually use the tools and equipment in the performance of our jobs, to report on the condition of the equipment furnished us.

Above all, we must remember that we owe it not only to ourselves, but also to our family, our fellow workers, and the community to do our job in a safe manner so as not to be a detriment to anyone.

A SAFE WORKER MAKES A SAFE SHOP

Trojan Foundries, Dallas, Tex., has moved into a new metal and masonry building at 1502 Plantation, Dallas. Homer Crowder has been made manager of all foundry operations.

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- *Produced to the highest standards of uniformity from the finest of raw materials.*

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Iron Foundry Grade—a readily soluble alloy for moderate chromium additions to cast iron.

High Carbon Grade—a standard alloy for ladle additions to irons melted at high temperatures, and for cupola addition as lump material.

Briquettes—a practical and convenient form for adding ferrochromium to the cupola.

Ferrochrome-Silicon—a medium carbon grade of this alloy is recommended as an ideal means of reducing chill, increasing strength and maintaining uniform structure in cast iron.

FERROSILICON ALLOYS

25% Grade—recommended for cupola or electric furnace additions.

50% Grade—a most economical means of adding silicon to the cupola charge.

75%, 80/85%, 85/90%, 95% Grades—for graphitization, inoculation and structure control of gray cast iron.

Briquettes—a practical and convenient form for adding ferrosilicon to the cupola without weighing.

FERROVANADIUM ALLOYS

Iron Foundry Grade—an economical means of improving the physical properties of cast iron.

SPECIAL ALLOYS

Graphidox No. 4—an alloy of silicon, titanium and calcium which gives maximum efficiency as an inoculant of cast iron.

V-5 Foundry Alloy—an alloy of chromium, manganese and silicon highly effective for controlling structures, increasing strength and reducing chill in cast iron.

Noduloy Alloys — effective, low cost alloys widely used in the production of nodular cast iron.

There is also a complete range of Vancoram alloys for steel foundry applications.

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Pittsburgh • Cleveland • Cincinnati • Columbus • Toledo

Activities of Foundry Groups

Central New York

ANNUAL Christmas party of Central New York Chapter of the AFS was held Dec. 12 in Syracuse, N. Y. Approximately 300 members and guests enjoyed a fine dinner, floor show and the music of Stan Kay and his Velveteers. In addition, a number of door prizes were distributed. Don Brainard, party chairman, and his committee deserve a hand for the fine arrangements.

To open the new year, 65 members and guests of the chapter met on Jan. 8 in Syracuse for a series of roundtable discussions. The nonferrous foundrymen, under the chairmanship of N. W. Meloon, Meloon Bronze Foundry, Syracuse, considered insulated risers. W. D. Dunn, Oberdorfer Foundries, Syracuse, also presented a resume of his trip to the International Foundry Congress.

The malleable iron discussion was under the direction of Don J. Merwin, Oriskany Malleable Iron Co., Oriskany, N. Y. The bag of castings which he brought is not an indication that he has gone into the junk business. Rather he had prepared them purposely to emphasize certain defects. Consideration of these defects was the basis of the discussion.

James Palmer, Ingersoll-Rand Co., Painted Post, N. Y., led the discussion of gray iron. Several scrap castings provided a lively treatment of such topics as whistlers, flow offs, chokes and step gates. The conclusion was that step gates may require a separate sprue for each ingate to be effective.

Immediate-past-chapter-chairman Don J. Merwin was presented his past-chairman's plaque and admitted to the sacred precincts of the past-chairman's club after proper investigation by Bill Dunn, Leon Hall and Curtis Fletcher. — *Bruce R. Artz, Pangborn Corp.*

WISCONSIN Chapter of the AFS met in January to hear R. G. Stevenson, executive vice president, Allis-Chalmers Mfg. Co., West Allis, Wis. From left to right, top view, are H. E. Ladwig, Allis-Chalmers, past president; Mr. Stevenson; and A. F. Pfeiffer, Allis-Chalmers, president. The bottom view shows a group of past presidents who were present. Left to right, front row, are G. K. Dreher, Waukesha Foundry Co.; G. E. Tisdale, Zenith Foundry Co.; D. C. Zuege, Sivyer Steel Casting Co.; and R. C. Woodward, Bucyrus-Erie Co. Standing, left to right, are W. W. Edens, Allis-Chalmers; J. G. Risney, Risney Foundry Supply Co.; Walter Gerlinger, Walter Gerlinger Inc.; and Mr. Ladwig. Photographs are by courtesy of Walter V. Napp, Delta Oil Co.

Philadelphia

A TALK on "Mechanization in Coremaking" was presented to the 200 members and guests of Philadelphia Chapter of the AFS present at the January meeting. Featured was Chester V. Nass, vice president of Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago. Mr. Nass provided the narration for the film on mechanized coremaking which Beardsley & Piper produced recently. A half-hour question and answer period followed his presentation at which Walter S. Giele, Walter S. Giele Co., Lebanon, Pa., served as discussion leader.

On Mar. 12 the chapter has arranged for three speakers to discuss: "Fracture Tests—Control for Brass and Bronze," by Fred Riddel, H. Kramer & Co., Chicago; "Fracture Tests—Control of Gray Iron," by John Rendall, Pusey & Jones Co., Wilmington, Del.; "Brittle Fracture Behavior of Steels," by William S. Pellini, Metals Process Branch, Naval Research Laboratory, Washington.

William Crawford, chief safety engineer of Liberty Mutual Insurance Co., will speak on "Safety in the Foundry" at the chapter's Apr. 9 meeting.

Both the March and April meetings will be held at the Engineers Club, Philadelphia.—*Charles R. Sweeny, Atlantic Steel Castings Co.*

Penn State

MEMBERS of the Penn State Student Chapter of the AFS have enjoyed and are looking forward to further interesting meetings dealing with production phases

(*Continued on page* 264)

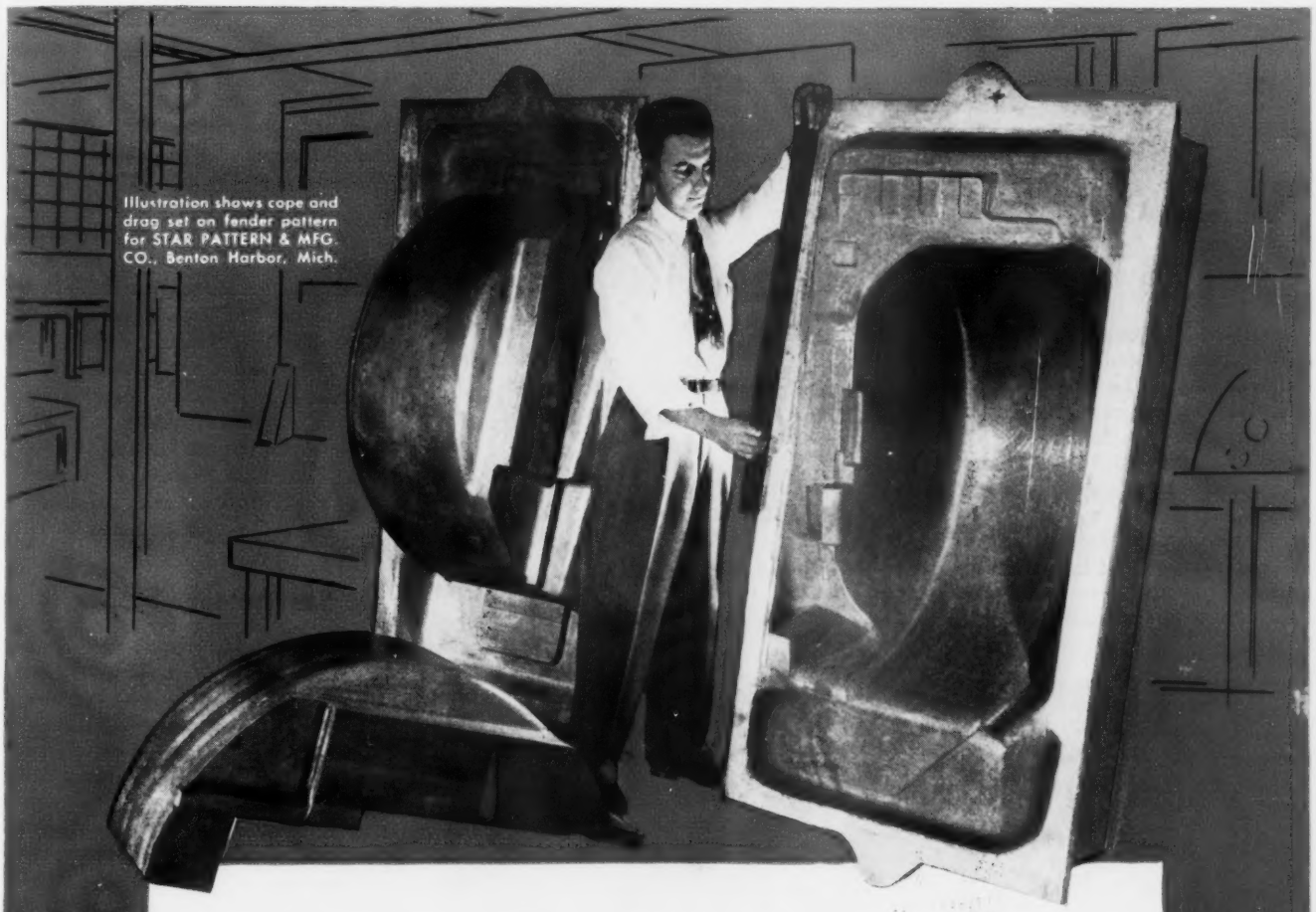

Illustration shows cope and drag set on fender pattern for STAR PATTERN & MFG. CO., Benton Harbor, Mich.

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look to **ACCURATE** cope and drag sets

Because they have been a profit maker for several hundred of the leading foundries all over America...

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Wherever used, Accurate cope and drag sets have been the means of producing greater volume of castings at lower costs.

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(*Continued from page* 262)
of the foundry industry. Under the guidance of their faculty advisors, D. C. Ekey and W. P. Winter, the group meets twice each month.

On Sept. 24, first meeting of the year, several films were presented which included one on "Microcast," produced by Au-tenal Laboratories; and "Quality Castings for Industry" by Textile Machine Works.

The Oct. 22 meeting centered around cores and coremaking, with A. S. Coulter of Archer-Daniels-Midland Co., as guest speaker. In addition, the films "The ADM of Cores" produced by Archer-Daniels-Midland Co., and "Mechanization in Coremaking" by Beardsley & Piper Division of Pettibone Mulliken Corp., completed the program.

Paul Beaver of the Penn State Extension staff spoke to the group on Nov. 19 on "On the Job Training." A liberally illustrated talk was presented by S. A. Crawford, Wellman Bronze & Aluminum Co., Cleveland, on the subject of radiography at the Dec. 15 meeting.

The FEF Advisory Committee is sponsoring the Mar. 25 meeting, and the group is endeavoring to have a former Penn State Student Chapter member, now associated with the industry, return to the campus in April to recount his experiences.

NFA MEETS IN WASHINGTON

THE Administrative Council of the National Foundry Association met in Washington Jan. 26-27 to consider the impact of some legislation now before Congress upon the foundry industry, and to discuss these problems with various officials of the government.

Following luncheon, Secretary of Labor James P. Mitchell outlined his concept of the primary function of his office and discussed certain recommendations of the president. A number of congressmen attended the dinner meeting and participated in a general discussion of the proposals of the president.

The following day, the members met with Assistant Secretary of Commerce, Lothair Teeter and the BDSA Administrator, Charles Honeywell. Plans of the Department of Commerce to hold industry conferences were outlined.

From left to right in the top view are Summerfield Brunk, NFA president; George Rose, NFA counsel; Secretary of Labor James P. Mitchell; and Herman Menck, past president of the NFA and now a member of the executive committee. Around the table, from the left rear, are Fred Busche, Herman Menck, Thomas Shroyer, George Rose, W. W. C. Ball, James P. Mitchell, Summerfield Brunk, A. V. Martens, C. T. Sheehan, G. Kastner, C. Kronner, H. Greenbaum, R. R. Washburn, A. Lysle Dyer, L. P. Robinson and Frank G. Steinebach. Standing left to right: Lewis Essex, R. Heiden, R. Sangrilli and J. S. Bridges

San Antonio Section

TWO interesting films were presented to 36 members and guests of the San Antonio section of Texas Chapter of the AFS. The first was entitled "Mechanization from Yard to Ladle," produced by Whiting Corp. and presented through the courtesy of E. C. Brown of that organization.

The second film was titled "Master of Fire, Servant of Industry," produced by A. P. Green Fire Brick Co. and presented by Freeman Henage and Charles Perry of that organization. A discussion period concluded the meeting. The group met at the Alamo Iron Works and refreshments were served following the meeting.

A showing of the sound film of the new Ford Cleveland Foundry was featured at the Jan. 14 meeting of the San Antonio Section of Texas Chapter of the AFS. The meeting was held at the San Antonio Machine & Supply Co. with 74 members and guests present. Refreshments were provided through the courtesy of W. H. Winterborne & Sons, San Antonio.—*Edw. W. Pruske, Alamo Iron Works*

Connecticut Non-Ferrous

MEETING at Hotel Garde, New Haven, Conn., members of the Connecticut Non-Ferrous Foundrymen's Association had as their speaker Bernard Meredith, metallurgist, Federated Metals Division, American Smelting & Refining Co. His subject was "Aluminum Casting Defects."

Defects covered were shrinkage and gas porosity, dross inclusions, brittleness from iron pickup, rat-tail lines, sand explosion pits and quenching cracks. However, gas porosity took up most of the discussion and its chief causes were listed as im-

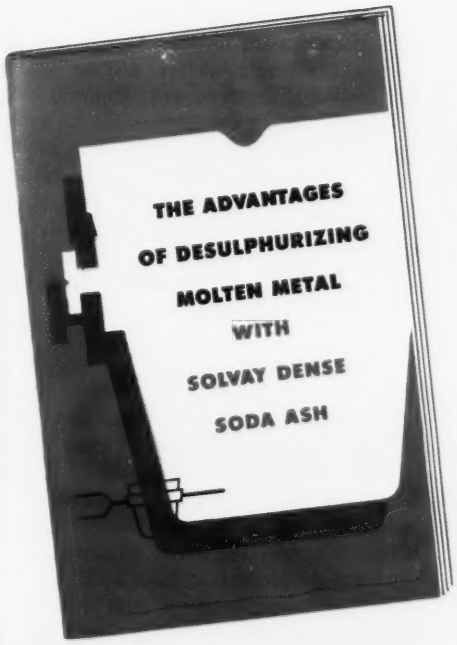
(*Continued on page* 266)

Desulphurization with SOLVAY DENSE SODA ASH

✓ Offers Many Advantages

✓ Costs Less

SOLVAY DENSE SODA ASH is especially effective for desulphurization. This 100% active material helps produce better, more fluid metal . . . and gives you these other advantages: it's free-flowing; the small grains melt very rapidly, allowing faster, more uniform dispersion; and it's easily added by means of simple equipment. The use of Solvay Dense Soda Ash is a flexible one—you use only as much as you need. And remember, Solvay Dense Soda Ash is the *low cost* form of desulphurization!



Further Information Contained in Valuable Book—Available on Request

"The Advantages of Desulphurizing Molten Metal with Solvay Dense Soda Ash" has been published by Solvay for the benefit of the foundryman. It contains important information on the advantages you can gain by desulphurizing with Solvay Dense Soda Ash. It also explains what type of equipment is needed and how to obtain it. This book is available free—on request—by simply writing to Dept. AT3, Be sure to get your copy.

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SOLVAY

TENNESSEE Chapter of the AFS met Jan. 15 at the Hotel Patten, Chattanooga. Left to right are Charles Chisholm, Wheland Co.; R. L. Orth, American Wheelabrator & Equipment Co., speaker; Chapter Chairman Will P. Delaney, Eureka Foundry Co.; and Leroy J. Wieschhaus, American Wheelabrator

(*Continued from page* 264)
proper melting techniques, corroded ingot, damp tools and wet fluxes. Fluxing with dry nitrogen was recommended for degassing aluminum.

Another common defect is entrapped air resulting from improper pouring. Use of square or rectangular sprues and avoidance of long metal drops by holding the crucible close to the sprue opening were recommended remedies. Turbulent pouring also generates dross which shows up in the casting as gray to black specks.

Reaction type porosity is usually found just under the skin on the cope side and results from reaction of hot metal with moisture in the sand. Venting the cope, cutting moisture content and opening up of the sand will help alleviate this condition.—*John V. McCarthy, North American Smelting Co.*

Tennessee

ALMOST 100 members and guests of Tennessee Chapter of the AFS were present at the Jan. 15 meeting, despite a heavy rain. R. L. Orth, field sales engineer, American Wheelabrator & Equipment Co., Mishawaka, Ind., spoke on "Design and Operation of Blast Equipment." W. P. Delaney, Eureka Foundry Co., chapter chairman, presided. Program chairman, Charles Chisholm, Wheland Co., introduced the speaker.

Limiting his talk to wheel blast equipment, Mr. Orth outlined the fundamentals of design, the selection of equipment to do the job, layout and installation, and operation and maintenance. He stated that more tons of castings may be cleaned a day per unit if the operators of the equipment are well trained and fully understand their jobs.—*W. F. Hetzler, Eureka Foundry Co.*

ST. LOUIS Chapter of the AFS gave an enthusiastic reception to speaker Harry E. Gravlin, production manager, Dearborn Iron Foundry, Ford Motor Co., left, at the meeting held Jan. 14. Below, chapter officers bid goodbye to Fred Riggan, foundry consultant, before his departure for Norway, where he also will act as a consultant. From left to right are Webb L. Kammerer, Midvale Mining & Mfg. Co., chairman; Mr. Riggan; Fred J. Boeneker, Bronze Alloy Co., vice chairman, and Paul Retzlaff, Nordberg

St. Louis

GUESTS at the January meeting of St. Louis Chapter of the AFS were members of the student chapter of the Missouri School of Mines and Metallurgy. Students and faculty members climaxed a day of foundry visits in the St. Louis area by attending the meeting which featured Harry E. Gravlin, production manager, Dearborn Iron Foundry, Ford Motor Co. He received a standing ovation following his talk on "Sand, Metal or Men."

Mr. Gravlin placed the key to success in our industry—as with any industry— in building of loyalty within our people by teaching them to participate to the extent that they feel a part of the industry and the job it is doing. He believes that when men feel the job they are doing is important, they will do a better job.

Lloyd C. Farquhar, American Steel Foundries, extended the chapter's greetings to the visiting students.—*J. R. Bodine Jr., Bodine Pattern & Foundry Co.*

Southern California

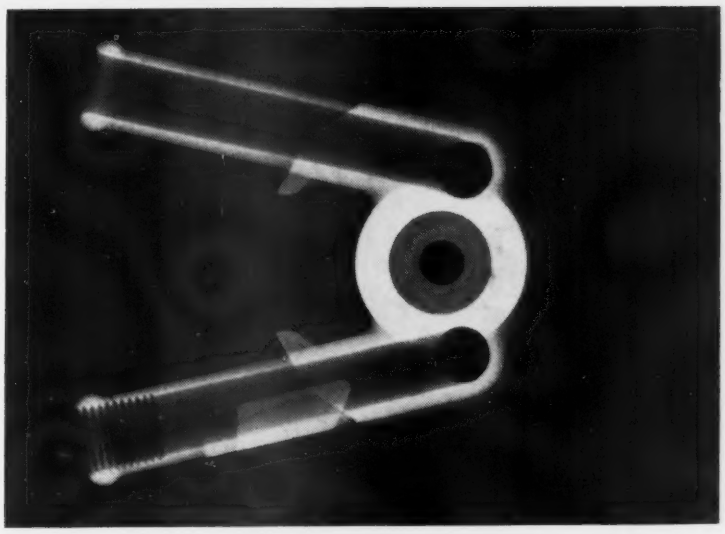
ANNUAL Christmas party of Southern California Chapter of the AFS was held Dec. 12 at the Lakewood Country Club in Long Beach, Calif. Approximately 400 members and guests were on hand to enjoy a pleasant evening. After a fine dinner, the Entertainment Committee conducted a drawing for cash and door prizes. The party was climaxed with an excellent variety program.

James Oliva, chairman, and the members of his committee, received well deserved applause for their excellent arrangements.—*Otto H. Rosentreter, Osborn Mfg. Co.*

Canton

A DISCUSSION of "New Advances in Foundry Welding" was presented at the Jan. 7 meeting of Canton District Chapter of the AFS. The meeting was held at the Canton Elks' Club, Canton, O., with 65 members and guests present to hear L. D. Richardson, sales manager and welding

(*Continued on page* 268)



More for the money?

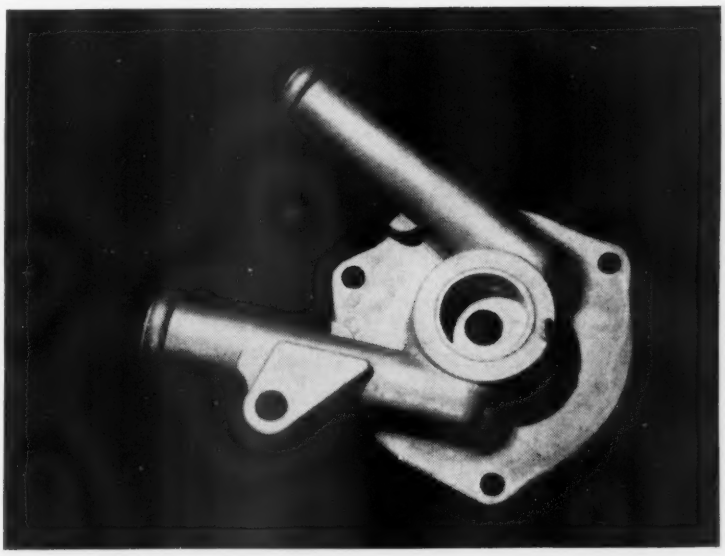
RADIOGRAPHY SHOWED HOW

This casting was a part for an automotive heater. With a big run and a low price, profit hinged on a high yield of sound castings.

Radiographs made of pilot castings revealed a few recurring faults and indicated how a minor change in casting technics could increase the yield.

This is just one more example that shows why it pays to use radiography—one more reason you find more and more progressive suppliers of castings using it.

If you want to be known for releasing only high-quality work, if you want to improve production—look into radiography. Your x-ray dealer will be glad to show you how it can help. And, if you wish, we'll send you a free copy of "Radiography as a Foundry Tool."



Radiography . . .

another important example of photography at work

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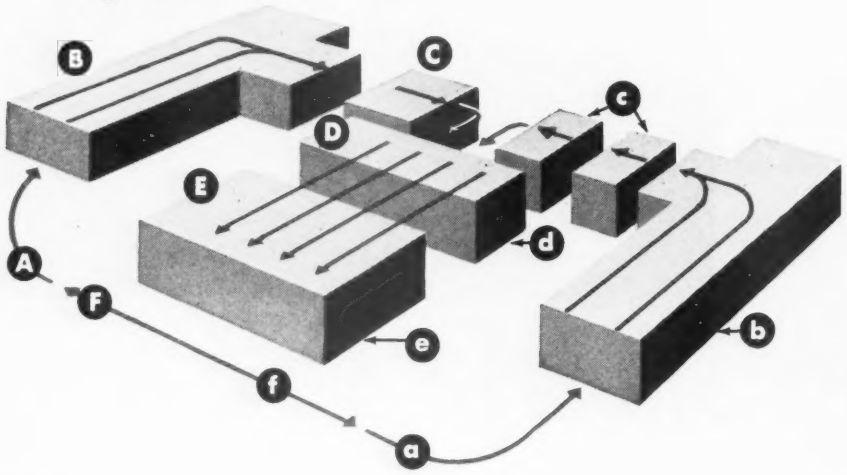
Heat Treat Furnace Layout

by *Holcroft*...6th of a Series



A. Load
B. 2-row continuous atmosphere carburizing furnace
C. Oil quench
D. 4-row washing machine
E. 4-row draw furnace
F. Unload

a. Load
b. 2-row continuous atmosphere carburizing furnace
c. Salt bath quench and air blast cooling station
d. 4-row washing machine
e. 4-row draw furnace
f. Unload

How to Beat Heat Treat Costs!

Here's a furnace layout which is tricky—yet functional; one which steps up production—yet is flexible enough for different cycles!

Holcroft designed it to handle a variety of transmission parts requiring different processing cycles. In one case, parts are carburized, oil quenched, washed, and drawn. In the other, the stock is carburized, quenched in a salt bath, cooled with an air blast, washed, and drawn. The wash machine and draw furnace, though common to both cycles, are electrically independent.

While production flows at a rapid pace, the battery is so automatic that only a two-man crew is required for loading and unloading—one man on each side!

This is the type of furnace engineering that pays off in lower heat treat costs *to you!* And it's available on simple single-furnace jobs, or complex multi-furnace installations. It will pay you to write for more information—today! Holcroft & Company, 6545 Epworth, Detroit 10, Michigan.

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EUROPE
S. O. F. I. M.
Paris 8, France

(*Continued from page* 266)

consultant, Steel Sales Division, Eutectic Welding Alloys Corp., the featured speaker.

Mr. Richardson described several new type welding rods and the methods that can be used to weld castings of all alloys, also patterns and welding for foundry maintenance.

Robert A. Epps, Stoller Chemical Co., and chapter chairman presided. Alfred S. Morgan, Babcock & Wilcox Co., introduced the speaker.—*R. R. Kozinski, Canton Malleable Iron Co.*

Birmingham

MORE than 125 members and guests of Birmingham District Chapter of the AFS turned out Jan. 15 to hear E. T. Kindt, Kindt-Collins Co., Cleveland, speak on "Pattern Engineering." The meeting was held at the Tutwiler Hotel with Edwin E. Pollard, Alabama Pipe Co., and vice chairman of the chapter, presiding.

E. T. KINDT
Kindt-Collins Co.

Mr. Kindt traced the evolution of patternmaking from ancient civilizations to the present day. He expressed the opinion that the patternmaking industry today is entering a new era in which the dogmas of the past century will be replaced by a new approach to the art. He then discussed several new developments in materials, equipment and technique. He illustrated his talk with a motion picture dealing with recent advances in the industry.

Albert J. Frutchl, resident manager, U. S. Pipe & Foundry Co., North Birmingham, was the coffee speaker. He reported to the chapter membership on the work and future plans of the Steering Committee, of which he is chairman.—*J. A. Wickett, U. S. Pipe & Foundry Co.*

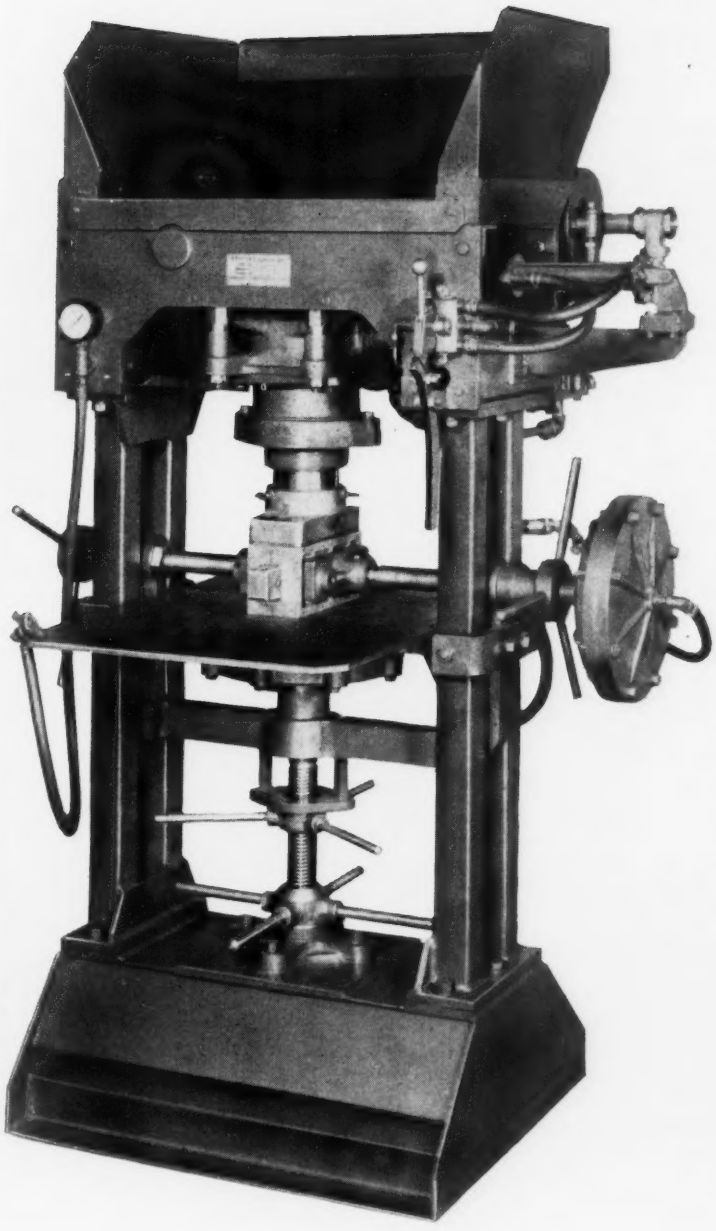
Rochester

PRINCIPAL speaker at the Jan. 5 meeting of Rochester Chapter of the AFS was H. K. Salzberg, Bordon Co., Bainbridge, N. Y. Mr. Salzberg discussed resin-bonded cores.

He stated many trials were the lot of foundries pioneering this method of making cores. Resin binders were tried to produce cores of hard smooth surface, providing a good finish, strong enough to be handled and yet easily collapsible.

(*Continued on page* 270)

Redford NO. 4 CORE BLOWER



Designed to add more power, capacity and speed to traditional Redford simplicity, flexibility and convenience, the No. 4 Redford superbly fills the need for a truly fast and flexible machine to blow cores from a few ounces to 10 lbs.

There is no need for the operator to wait for the machine at any time—the fast operating cycle permits immediate release of the core box after the cores have been blown.

Exhaust air is utilized to thoroughly fluff the sand remaining in the sand magazine after each blow, thus reducing the possibility of cratering.

Magazine heads normally furnished with the No. 2 Redford machine can be used with the No. 4 Redford. Larger new type magazine heads are also available as standard equipment.

A completely new fully adjustable clamp for vertically parted core boxes simplifies core box set up—when not needed the clamp units can be adjusted all the way out or completely taken off the machine.

Redford No. 4 users report production up to 8 boxes per minute using only one core box per machine. To get complete information write for Specification Bulletin 4.

Cores at right illustrate wide range of work that can be done with the Redford No. 4 Core Blower.

Redford IRON & EQUIPMENT CO.

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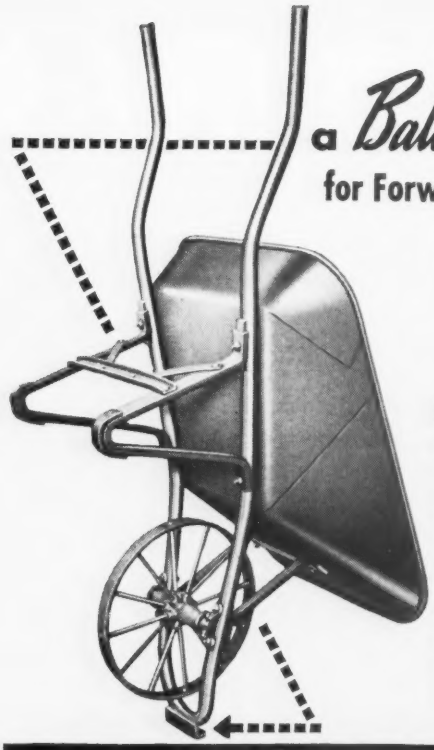

a *Balanced* BARROW
for Forward-End Dumping!

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This Sterling Wheelbarrow has a reinforced tubular steel frame with special steel nose shoe. Provides perfect balance for forward end dumping and extra strength for heavy duty service. Rugged construction includes V-shaped tray braces and 12-spoked steel wheel. Ideal for wheeling sand, scrap, castings, coal and other heavy bulk materials. Can be furnished with pneumatic or zero pressure wheel. Prompt shipment.

Write for literature.

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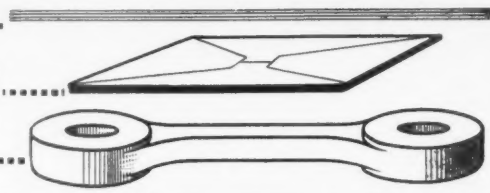
FOUNDRY EQUIPMENT
STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

A 5377-13

Gamma rays.....



unexposed film.....

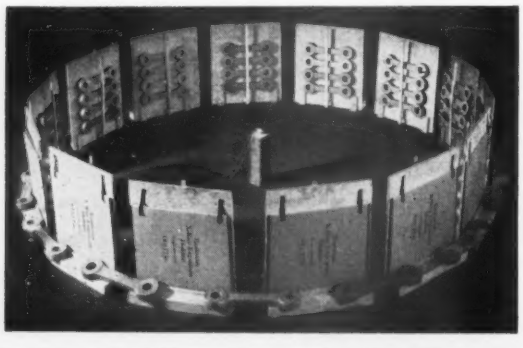
steel casting.....

RADIUM RADIOGRAPHY

improves foundry practice and production

Compared with X-ray radiography, radium radiography is new, but its peculiar advantages have been finding increasing favor with steel foundries. The first commercial radiograph with radium was made in 1930—and by 1950 250 steel foundries throughout the country were using radium radiography. The constant activity of radium, the even dispersion of its rays with a minimum of scattering; the portability of the equipment and simplicity of operation all combine to make radium radiography an economical non-destructive method of testing. Write today for case histories and additional information. *Your requirements promptly supplied.*

Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings



RADIUM CHEMICAL CO., INC.

New York: 161 East Forty-second St., Chicago: Marshall Field Annex Bldg., Los Angeles: 3723 Wilshire Blvd.

(*Continued from page* 268)

Two types of resin binders are phenol and urea. Urea-bonded cores may be stored for six months or more and produce satisfactory castings. Cores with phenol binder must be used immediately. Resins are used with cereal binder and water in correct proportions to produce the desired strength. Clay in the sand reduces the green strength of the core.

ROCHESTER Chapter of the AFS heard H. K. Salzberg, Borden Co., Bainbridge, N. Y., discuss resin bonded cores at its Jan. 5 meeting

Mr. Salzberg cited two precautions necessary with resin binders. Resin-bonded sand must not be allowed to contaminate molding sand since the resin reacts with heat; and phenol resins are injurious to the skin and must be handled with caution.

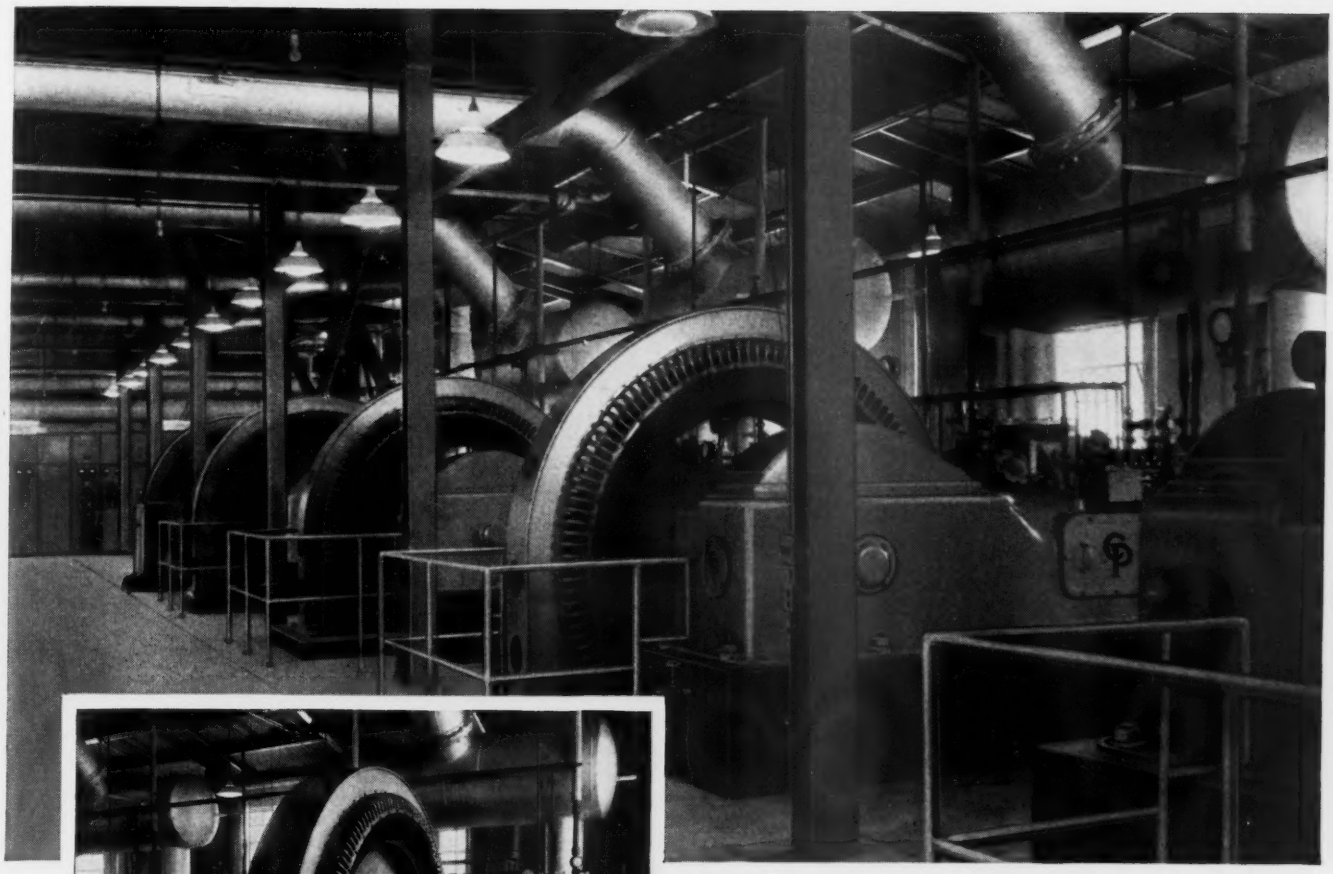
The manufacturers of resin bonding materials, he stated, have approved for 1954 large budgets for further laboratory investigation into sands, new binders and partings.—*H. G. Stellwagen, Hetzler Foundries Inc.*

Cleveland Non-Ferrous

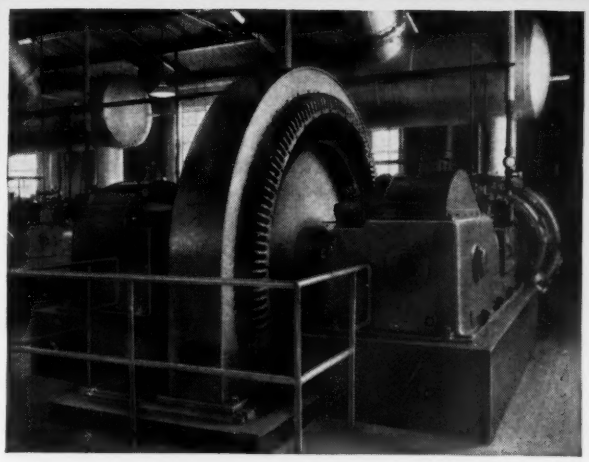
A DEMONSTRATION on the importance of cost accounting was presented to members of the Cleveland Chapter of the Non-Ferrous Founders' Society at its Jan. 21 meeting held at the Cleveland Athletic Club. The speaker, U. F. von Rosen, CPA, Soloway & von Rosen, Cleveland, announced that a cost clinic will be initiated Feb. 11. There will be six sessions meeting every other Thursday during which costing methods for all types of foundries will be covered. Particular attention will be given to the pricing of castings.

Tom Gallagher, executive secretary of the Ohio State Foundry Legislative Association, outlined briefly what happens to legislation

(*Continued on page* 272)



Five 1,000 hp Class O-DE compressors installed in a chemical plant.



CP COMPRESSORS

ON TAP 24 HOURS A DAY!

Chicago Pneumatic's heavy duty, Class O Compressors are a prime favorite where 24 hours-a-day service is required.

Engineered for continuous, heavy-duty usage, the Class O affords complete dependability with low operating cost. And they require minimum attention and upkeep. Built in sizes up to 2,000 hp, they're available in single and multi-stage designs, steam and electric drives, for a wide range of pressures. For more information write for Bulletin 726. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

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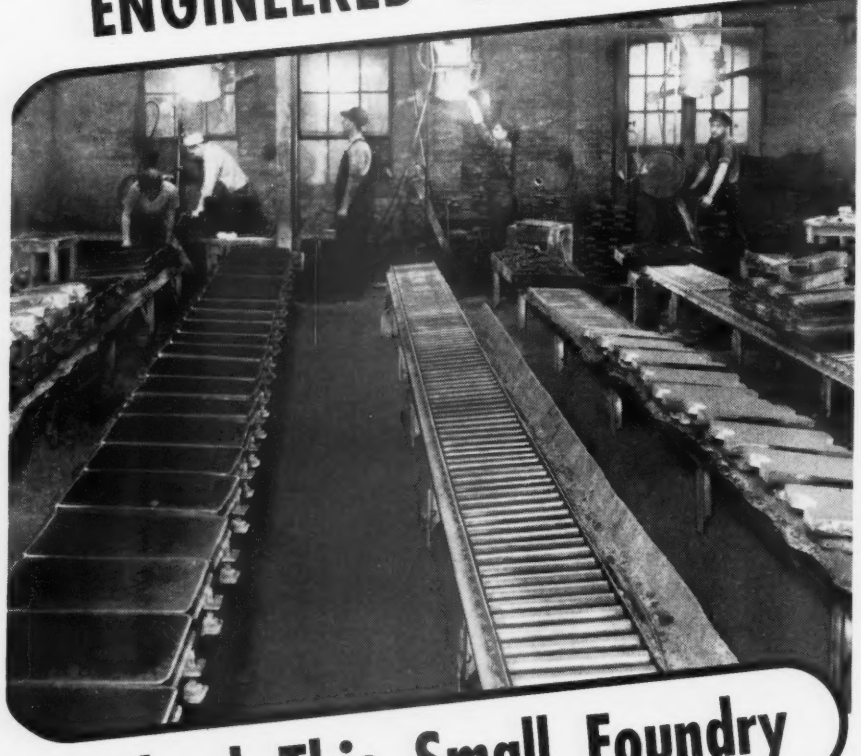
ALVEY-FERGUSON
ENGINEERED CONVEYORS



Helped This Small Foundry
INCREASE PRODUCTION 40%

ILLUSTRATING how the operation of a small plant can be made *more* efficient through the installation of an A-F *Engineered* Conveying System, this small Ohio foundry was able to easily increase its production 40% without increasing its floor space.

In small foundries especially, efficient operation makes the big difference between loss—and profit! But no matter how small or how large *your* foundry may be, you too can boost your production and reduce costs with an A-F *Engineered* Conveying System. Just think of being able to re-use sand four, five or more times a day, of re-using flasks many more times a day, and of improving the quality of your product while reducing rejects and breakage!

Without obligation on your part, write for a discussion of your sand, mold and flask handling problems—today.

THE ALVEY-FERGUSON
OF CINCINNATI
102 Disney St. Cincinnati, Ohio

SINCE 1901...FIRST IN PRODUCTS HANDLING EQUIPMENT

(*Continued from page* 270)

in the Ohio House and Senate which does not have proper backing. He stated the Ohio State Foundry Legislative Association is striving to elect representatives to back bills which are fair to the foundry industry.—*Walter O. Larson Jr., Grafton Foundry Co.*

Mo-Kan

ANNUAL Christmas party of Mo-Kan Chapter of the AFS was held in the ballroom of the President Hotel, Kansas City, Mo., on Dec. 14. The party included members, their wives and friends, and the attendance was more than 300. Dinner was followed by the distribution of a number of door prizes and the evening concluded with dancing. —*C. W. Boettcher, Black Sivalls & Bryson*

Northeastern Ohio

OVER 200 persons were present at the Jan. 14 meeting of Northeastern Ohio Chapter of the AFS, held at the Tudor Arms Hotel, Cleveland. Vice Chairman, Dave Clark, Forest City Foundries Co., Cleveland, presided. Coffee speaker was R. C. Hienton, Cleveland Electric Illuminating Co., who discussed the industrial development of the northeastern Ohio area which CEI has designated "the best location in the nation."

Special guests included William W. Maloney, secretary-treasurer of the AFS; his administrative assistant, D. J. Hayes; and Al Hilbron, AFS convention and exhibits manager. Speaking briefly, Mr. Maloney predicted that the Cleveland convention in May will be the greatest yet.

(*Continued on page* 274)

NORTHERN CALIFORNIA Chapter of the AFS heard James S. Campbell Jr., assistant professor of mechanical engineering, University of California, Berkeley, Calif., discuss resin binders on Dec. 14. About 100 members and guests were in attendance

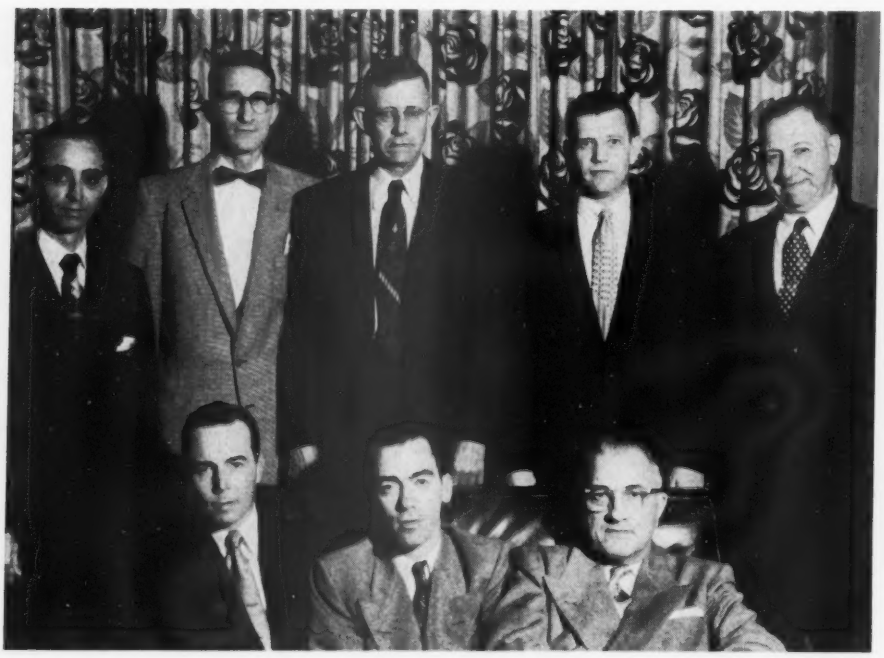
NEW SAND CONDITIONING AND MOLDING SYSTEM

CENTRAL IRON FOUNDRY CO. — **DETROIT, MICH.**

TWIN CITY Chapter of the AFS met Jan. 12 to hear a discussion of green sand molding. Shown here, from left to right, are O. Jay Myers, Foundry Products Division, Archer-Daniels-Midland Co., chairman of the chapter; Clyde A. Sanders, vice president, American Colloid Co., guest speaker for the evening; and A. W. Johnson, Northern Malleable Iron Co., vice chairman. Photograph is by courtesy of R. J. Mulligan, Archer-Daniels-Midland Co.

(*Continued from page* 274)

Technical speaker was Warner B. Bishop, Foundry Products Division, Archer-Daniels-Midland Co., who discussed the "D" molding process, developed by Harry Dietert, Harry W. Dietert Co., Detroit, in conjunction with ADM. His able description of the history, development and current applications of the process was well received, and considerable discussion ensued.—*Jack C. Miske*



MO-KAN Chapter of the AFS is represented during 1953-54 by these officers. Seated from left to right are Lloyd Canfield, Canfield Foundry Supply, vice chairman; William N. Chivis, Magnus Metal Division, National Lead Co., chairman, and H. P. Swickrath, Prier Brass Mfg. Co., treasurer. Standing from left to right are T. F. Shadwick, Witte Engine Works; Howard Julian, Blue Valley Foundry Co.; Henry Deterding, Sonken Galamba Co.; John Redman, Redman Pattern Works; and C. W. Boettcher, Black, Sivalls & Bryson Inc. Mr. Julian is the secretary of the chapter, and the others are directors

New England

FIFTY-EIGHTH annual meeting of the New England Foundrymen's Association was held Jan. 13 at the University Club, Boston. Newly elected officers to serve during 1954 include: President, Henry G. Stenberg, Draper Corp., Hopedale, Mass.; vice president, Howard B. Nye, Crompton & Knowles Loom Works, Worcester, Mass.; secretary-treasurer, Thomas I. Curtin Jr., Waltham Foundry Co., Waltham, Mass.

Members of the executive committee include: Howard B. Nye, chairman; Ahti A. Erkkinen, Builders Iron Foundry, Providence, R. I.; Henry M. Frechette, Fitchburg Foundry Inc., Fitchburg, Mass.; Albert M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass.; Clyde Armstrong, Warren Pipe & Foundry Co., Everett, Mass.; C. W. Hutchins, Standard Foundry Co., Worcester, Mass.; Alexander Beck, Whitman Foundry Inc., Whitman, Mass.; Ernest S. Frens, General Electric Co.; Charles A. Reed, Rogers-Brown-Lavino, Philadelphia.

Retiring president Joseph B. Stazinski thanked the officers and the executive committee for their fine co-operation and the membership for their attendance during his term of office.

Dr. C. M. Adams, assistant professor of metallurgy, Massachusetts Institute of Technology, spoke on the production of high-strength cast aluminum. An extended discussion period followed his talk. — *Alexander Beck, Whitman Foundry Inc.*

Chicago

FOR its regular meeting on Feb. 1, Chicago Chapter of AFS heard a brilliant presentation on "Feeding Range of Risers" by William S. Pellini, superintendent, metallurgy division, Naval Research Laboratory, Washington. Some 215 members of the chapter and their guests were in attendance at the Chicago Bar Association.

Chapter President John A. Rassenfoss, assistant director of research, American Steel Foundries, presided.

Roy W. Schroeder, associate professor, foundry and pattern laboratory, University of Illinois, Navy Pier, and chairman of the chapter's educational committee, announced that a "School of Coremaking" has been arranged for Mar. 9 and 16, at the university. Subject to choice of registrants, a third night on Mar. 23 can be provided.

At this point, President Rassenfoss announced establishment by the chap-

(*Continued on page* 276)

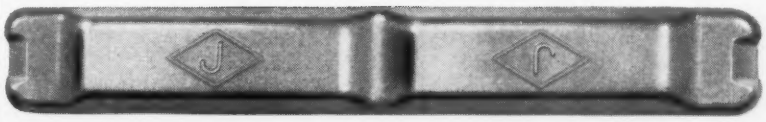
Specific Gravity is Important

To Your Casting Costs

ALMAG 35

ALUMINUM ALLOY

. . . with a Low Specific Gravity of 2.62, Gives You More Castings Per Pound



Because Almag 35 weighs less than standard aluminum alloys, it contains more cubic inches of metal per pound (s.g. 2.62).

This is an important saving in your foundry operations because it means you can get more castings per pound of Almag 35 than with most other aluminum alloys.

Reduced freight and handling costs also add up to make Almag 35 the most practical aluminum alloy for high structural and finish requirements.

Before you specify any alloy, ask for Almag recommendations.

Covered by U.S. Patents Nos. 2564044, 2628899, 2583473. Other Patents Pending

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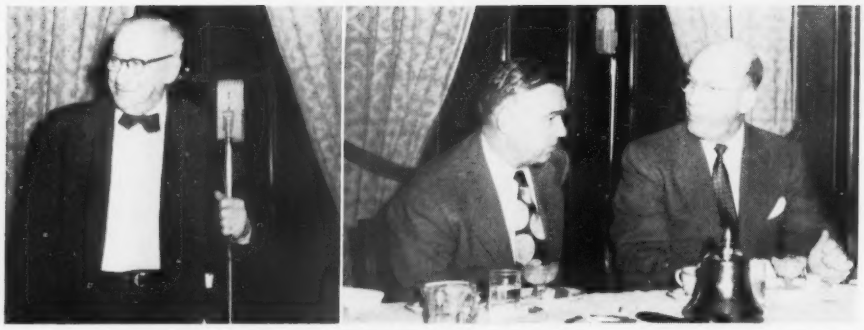

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION paid tribute at its December meeting to foundry salesmen, particularly to Harry Impey, Tabor Mfg. Co., who retired in 1953 after 45 years of visiting foundries. Left to right are Mr. Impey; Joseph B. Stazinski, General Electric Co., president of the New England group; E. C. Jeter, Cleveland Ford Foundry, Cleveland, speaker

(*Continued from page* 274)

ter of the Robert E. Kennedy Scholarship at the University of Illinois, Chicago Undergraduate Division, and supported by a $5000 contribution to the university's endowment found. Details of this ceremony are given elsewhere in this issue.

AFS National Director C. V. Nass, vice president, Pettibone Mulliken Corp., was introduced. A member of the Chicago chapter and its president during 1950-51, Mr. Nass was making an official "National Officer" visit. He complimented the chapter for its continuous and high-ranking performance. Particularly noteworthy, he thought, was the recent establishment of the Maintenance Division as an additional chapter activity.

Mr. Pellini, the guest speaker, was introduced by Chapter Vice President Robert L. Doelman, sales engineer, Miller & Co. In recent years Mr. Pellini has conducted considerable research on directional solidification of metal and is a leading expert on the subject. He has spoken widely—before AFS annual meetings and numerous chapters. His views on the feeding of castings, therefore, are rather well known. On this occasion, however, he was able to supply some new information recently derived from further investigation on the subject.

Next chapter meeting will be held at the Chicago Bar Association on Mar. 1 and will feature two outstanding speakers to discuss "Recent Developments in Molding Processes." The platform will be shared by Tom E. Barlow, sales manager, Eastern Clay Products Department, International Minerals & Chemical Corp., Chicago, and Frank S. Brewster, general manager, Harry W. Dietert Co., Detroit. Entertainment will be provided by the glee club of Continental Foundry & Machine Co.—*Erle F. Ross*

CHICAGO Chapter of the AFS held a roundtable meeting Jan. 4. Top view shows Jerry Grott, research metallurgist, Unitcast Corp., Toledo, O., steel session speaker. Left to right, bottom view, are Hans J. Heine, acting technical director, AFS; John A. Rassenfoss, American Steel Foundries, president; B. C. Yearley, director of applied research and development, National Malleable & Steel Castings Co., Cleveland, malleable session speaker; and R. P. Utz, National Malleable & Steel Castings Co., Cicero, Ill., malleable chairman. Photographs are by Fred Ridenour, Whiting Corp.

Boston Non-Ferrous

MEMBERS of Boston Chapter of the Non-Ferrous Founders' Society met Jan. 28 at the Engineers Club, Boston, to hear Clyde M. Adams Jr., assistant professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., speak on "High-Strength Cast Aluminum."

Referring to work done at the institute, Dr. Adams pointed out the reason cast aluminum is inferior to wrought aluminum in physical properties is its relatively high gas content. This hidden porosity is usually microscopic and not apparent to the naked eye. However, it is there in quantity large enough to reduce inherent strength of the metal by as much as 50 per cent.

Degassing with dry nitrogen or chlorine has been found effective. To judge when the metal is ready for pouring, a small sample of the molten metal is placed under a bell jar where it is immediately subjected to reduced pressure of 1/10th of an atmosphere. If the metal still contains appreciable gas the surface will *puff* under the reduced pressure: if ready for pouring, the surface will not swell. Metal once degassed must not be allowed to stand or it will pick up gas from air over the melt.

Pouring should be quiet and as free from agitation as possible. Mold materials vary widely in the gas pick-up they promote. Dry sand causes the least, with shell molds next and green sand the worst. Heavy chilling has been found effective in achieving temperature gradients that help the feeding of the casting.—*John V. McCarthy, Vesuvius Crucible Co.*

Pittsburgh

DESPITE near-zero weather, 140 members and guests of the Pittsburgh Foundrymen's Association met at Webster Hall Hotel Jan. 18. Featured speaker was Robert H. Zoller, president of Zoller Casting Co., Bettsville, O. Harold Gassner,

(*Concluded on page* 278)

Thermex
ELECTRONIC CORE-BAKING EQUIPMENT

HOW YOU CUT COSTS

when you cut baking time 96%

One of two 60 KW THERMEX Electronic Core Baking Units at James B. Clow & Sons, Coshocton, Ohio. Modernization of this core room has cut manhours 33%.

BEFORE MODERNIZATION of this foundry, core-baking time with old ovens was 16 hours. Now, with two 60 KW THERMEX* Core Baking Units, baking time is only 30 minutes. The advantages of this 96% savings in baking time are:

1. Improves core quality. They don't sag. They are stronger. Their surface is smoother and harder.

2. Cuts handling costs. Rammers place cores directly on conveyor of baking unit. After baking, cores are placed on skid, ready for use.

3. Cuts storage space. Cores move continuously from sand rammer to molding floor.

4. Fewer core plates needed because their turnover is faster.

5. Special core runs can be made quickly. No delays.

Investigate THERMEX Electronic Baking Equipment today! Mail the coupon for free booklet. The Girdler Company, Thermex Division, Louisville 1, Kentucky.

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Please send me the new booklet on Electronic Core-Baking

Name .....

Position .....

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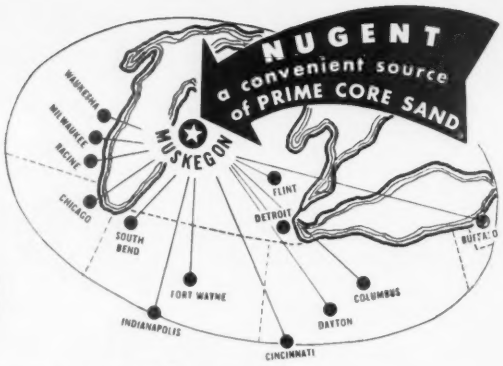
City ..... State .....

FIVE GRADES of CORE SAND



tested before you use them!

Exclusive with Nugent — 5 grades of dune sand processed from the best Muskegon Dune Sand — dried — graded to a constant AFS grain analysis of 39, 43, 48, 52 and 55 maintained through daily testing. Gives more uniform cores — consistently uniform molds — complete shipping and bulk storage facilities — prompt shipments of sand by rail or truck when you need it — based on over 40 years of "know how" supplying prime core sand.

Call or write your Nugent Representative today

INDIANA PRODUCTS CO.
Kokomo, Indiana

WARNER R. THOMPSON CO.
Detroit 8, Michigan

KEENER SAND & CLAY CO.
Columbus 15, Ohio

CARPENTER BROTHERS, INC.
Milwaukee 3, Wisconsin

GREAT LAKES FOUNDRY SAND CO.
Detroit 26, Michigan

1912 **CANNON** core sand *1954*

THE NUGENT SAND COMPANY, INC. **MUSKEGON, MICHIGAN**

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An Efficient EF CAR TYPE Furnace

may be just the answer to *your* requirement

Reflecting the advantages of our experienced engineering and correct design EF Car Type furnaces come up to temperature quickly—are easy to load and unload—and assure *uniform* heat treatment of the entire charge. These furnaces are highly efficient for annealing castings, bars, plates, etc.,—stress relieving weldments,—and a wide variety of other heat treating operations.

We build batch and continuous furnaces—gas-fired, oil-fired and electrically heated for any heat treating requirement. For maximum efficiency and satisfaction consult with EF engineers on *your* next furnace job.

Gas-Fired, Oil-Fired EF ***and Electric Furnaces***
for any Process, Product or Production

THE ELECTRIC FURNACE CO.
WILSON ST. at PENNA. R. R. *Salem - Ohio*

Canadian Associates • Canefco Ltd. • Toronto 1, Canada

(*Concluded from page 276*)

vice president, Rosedale Foundry & Machinery Co., Pittsburgh, introduced the speaker, whose topic was "A New Era in Melting."

In Mr. Zoller's Bettsville foundry, modern mechanization has centered about the task of cost control. Looking first to the cupola, the question was raised, "Why do we have so many hours in repair? How can we eliminate delay of production in the morning?"

Mr. Zoller stated that basic wedge brick refractories were installed but tests did not bring the required increased life of the basic refractory lining. Next step was to eliminate man-hours involved in bottom-dropping. "To our knowledge no one had been operating a cupola without repairs for one full week successfully in high production. After eliminating bottom-dropping we no longer had to wait for iron in the morning. Iron was always hot at the start of the day because our cupola had been held as a melting unit since the previous day's operation. We felt we had accomplished something after starting a cupola and not dropping bottom until after 40 or 50 hours of actual pouring time."

Development of the cupola and its operation was described in the September, 1953 issue of FOUNDRY in an article entitled "Drops Cupola Bottom Once a Week." — *Robert Love*

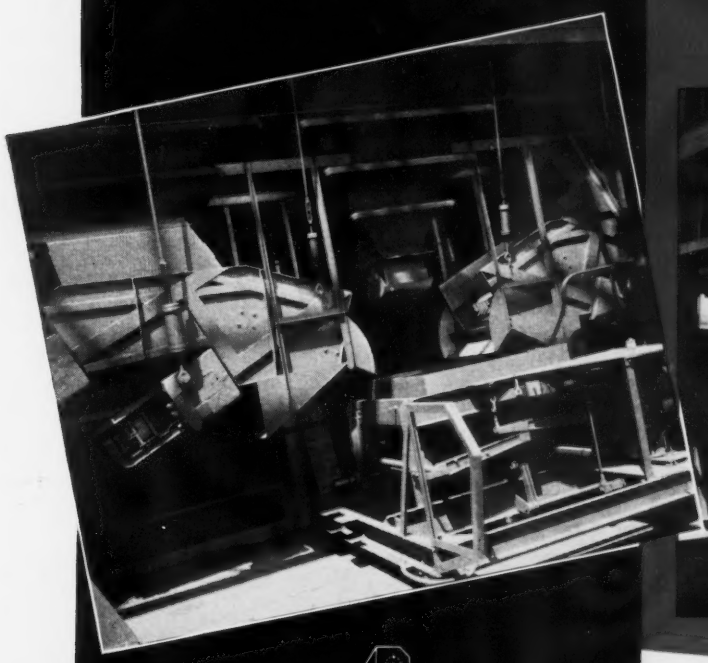
Reading

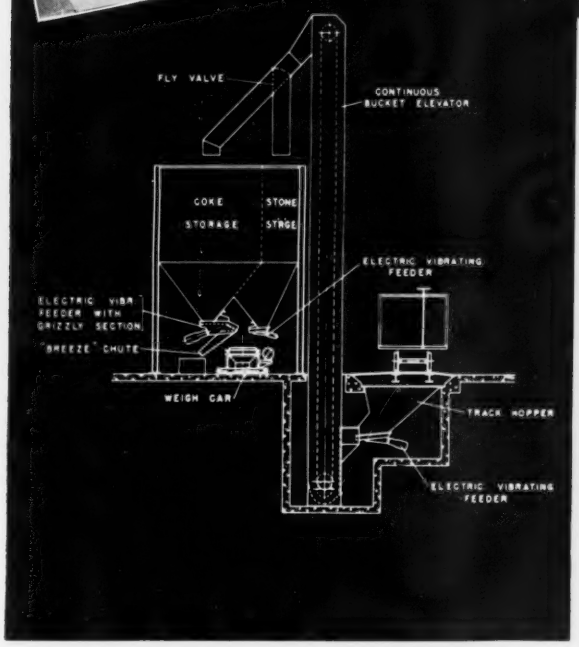
SPEAKER at the regular meeting of the Reading Foundrymen's Association, held Jan. 19 at the Berkshire Hotel, Reading, Pa., was Chester V. Nass whose subject was "Mechanization in Coremaking." Mr. Nass is vice president and general manager of Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago. He was introduced by Hermann P. Good, manager of the foundry division of Textile Machine Works, Wyomissing, Pa., who served as technical chairman.—*William I. Cassidy*

Carborundum Buys Firm

Agreement has been reached for Carborundum Co., Niagara Falls, N. Y., to acquire the capital stock of American Tripoli Corp., Seneca, Mo. American Tripoli owns Ozark Mountain deposits of a double refracting form of silica of the chalcedony variety, as well as a plant for its production. The substance is used in foundry partings, buffing and finishing compounds and in other formulations.

COKE AND LIMESTONE UNLOADING and HANDLING





The illustrations above show how Jeffrey Electric Vibrating Feeders are used for controlling feed in coke and limestone handling operations. The pan feeders control feed to bucket elevator and to draw off coke and stone from storage bins. The grizzly feeder eliminates coke "breeze" in charge.

Study the drawing. It shows a typical system with both coke and stone being handled by one continuous-type bucket elevator.

Single units or complete systems are available as well as sound advice and help through experienced foundry engineers. Our Foundry Catalog No. 845 will be sent along on request.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

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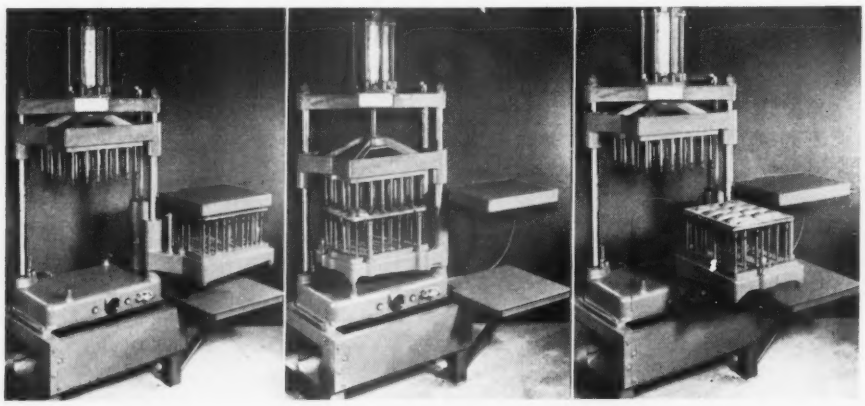
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

New EQUIPMENT and



Shell Bonding Fixture: Shell Process Inc., Chicopee, Mass.—Used in conjunction with the company's automatic shell molding machine, shell bonding fixture produces assembled shell molds, ready to pour. Fixture applies the adhesive, which most commonly is a long-flow shell molding resin, and has a production rate of about 80 shell molds per hour. Standard fixture can be used to bond shell molds up to 15 x 20 in. and can be adapted, with minor modifications, for molds up to 20 x 30 in. Unit features rapid interchangeability without the need for removing the pressure plates from the fixture. Pressure pins may be shifted to a changed pattern in a few moments, according to the manufacturer, enabling continued production without serious downtime. Molds bonded with this fixture reportedly can be poured horizontally, without backup, cope weights or support. The bonding operation makes use of the residual heat in the shells to cure the bonding agent.

For More Details Circle No. 1—Page 283

Thermocouple Well: Bristol Co., Waterbury 20, Conn.—Thermocouple protection tube is said to combine thermal conductivity and shock resistance of metal with oxidation and deformation resistance of ceramics. Because the wall is only ⅛-in. thick, time lag in temperature response is small. Material has thermal conductivity about the same as that of cast iron. Manufacturer states that the tubes have strength at high temperature and are resistant to attack by molten steel and slag as well as to air oxidation and combustion gases. Available in 12, 18 and 24-in. lengths, the metal-ceramic well also can be supplied in a complete thermocouple assembly, including straight, connection head extension and connection head angle types.

For More Details Circle No. 2—Page 283

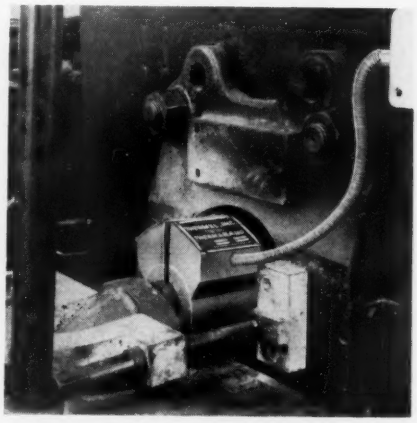
Metal Primer: Plasti-Kote Inc., 425 Lakeside Ave. Northwest, Cleveland—A self-spraying gray metal primer has been added to the firm's line of aerosol products. It has a zinc chromate base and is used for painting all metal surfaces. The new product is available in a 12-oz can with a self-spray attachment.

For More Details Circle No. 3—Page 283

Air Hammer Tools: Salsbury Corp., 1161 East Florence Ave., Los Angeles—Each of four air hammer tool kits, for general maintenance, foundry work and welding, features a powerful 36-oz air hammer and five tools designed for scaling, peening, drilling, metal cutting, smoothing, riveting, rivet busting and weld breaking. Hammers can be operated in a straight line or at a 90-degree angle. Additional tools and tool blanks are available for use with the hammer, which requires an air volume of 5 cfm at 100 psi to deliver 6000 blows per minute.

For More Details Circle No. 4—Page 283

Nozzle Heater: Thermel Inc., 3440 West Lake St., Chicago 24—Heater for die casting nozzles is reported to be designed and built to the exact physical dimensions of the nozzle and to correct thermal loads governed by the total pound per hour of output desired. It assertedly eliminates freezing of die casting material in the nozzle at the end of the casting cycle, ends uncontrolled nozzle warping and reduces tendency of the nozzle heater to overheat the die. Installation of thermocouple controls gives close temperature control.



For More Details Circle No. 5—Page 283

Valves: Pennsylvania Pump & Compressor Co., Easton, Pa.—Valves for conditions of service as high as 500 psig are reported to replace stop and safety valves and to check downtime, noise, vibration and tank ring when installed on the discharge line of air and gas compressors. Because they are automatic, they eliminate the danger of personnel's forgetting to open a valve before starting up.

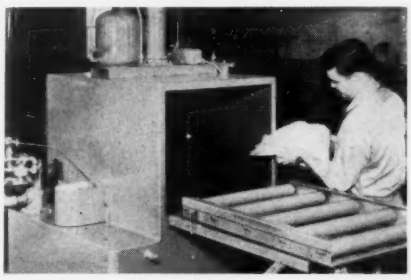
For More Details Circle No. 6—Page 283

Metal Cleaner: Ipsen Industries Inc., 715 South Main St., Rockford, Ill. — Noncorrosive ferrous metal washing compound removes oil, grease, lubricants, soils and lapping

SUPPLIES

For More Details on these Items Use Reply Card—Page 283

and drawing compounds. Suitable for both batch and spray type washers, the degreasing agent will produce metallurgically clean work pieces within 3 to 10 minutes in circulating type washing equipment, according to the manufacturer. It is said to be odorless and nontoxic and not to corrode or etch finished metal parts. Less than 1 oz is required per gallon of water.



For More Details Circle No. 7—Page 283

X-Ray Film Processing: General Electric Co., 4855 Electric Ave., Milwaukee 1—Liquid chemical is claimed to slash x-ray film processing time 50 per cent. After the fixing process, films are put in the new solution for 5 minutes; this step assertedly reduces necessary washing time to 5 minutes instead of the usual 35 or 40. Drying time also is cut since films are not saturated with either fixer or water, and the neutralizing action of the solution is reported to preserve films so that they may be kept for years without danger of staining. Manufacturer states that 1 gal of the solution mixed with 4 gal of water will process 1600 to 2000 14 x 17-in. films.

For More Details Circle No. 8—Page 283

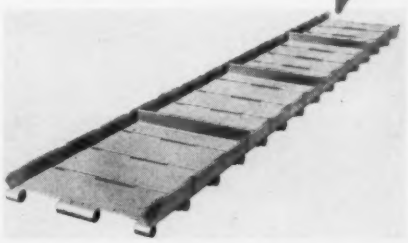
Dual-Fuel Burner: North American Mfg. Co., 4455 East 71st St., Cleveland 5— Company has added a burner with 2½-in. air connection to its line of dual-fuel burners. All burners in the line can be operated on heavy oil, light oil or gas, with either manual or automatic control. Low-pressure air is used for oil atomization, pressure requirements at the burner being 22 osi for heavy oil and 14 osi for distillate oil. Capacity of the new burner when operating on gas with combustion air pressure of 16 osi at the burner is 925,000 Btu per hour. Capacity on oil is 1,200,000 or 1,350,000 Btu per hour.

For More Details Circle No. 9—Page 283

V-Belt: Raybestos - Manhattan Inc., Manhattan Rubber Division, Passaic, N. J.—V-belt is said to offer long life and an increase of 40 per cent in horsepower capacity average. On new drives, narrower sheaves than usual can be used, saving space, because fewer belts are required for the same power demands. Constructed entirely of synthetic rubber, it reportedly has practically no stretch and is oilproof, nonspark and heat resistant.

For More Details Circle No. 10—Page 283

Apron Conveyors: Link - Belt Co., 307 North Michigan Ave., Chicago 1—Augmented line of piano-hinged apron conveyors in three pan types, four chain pitches and four basic assemblies is designed to meet a variety of conveyor applications. Pans are interlocked at articulation point to provide a minimum of opening and a smooth joint and to prevent material from seeping through. Tightness of hinges reduces tendency to wedge or pinch conveyed materi-



Front End Loader Is Adapted to Foundry Use

Front End Loader: Baker-Lull Corp., 314 West 90th St., Minneapolis 20—New model front end loader with a 12-cu-ft bucket digs, carries, loads and dumps up to 1500 lb of sand per lift. It lifts as much as 7 ft high. Turning radius of 90 in. permits working from boxcars and small bins. Loader bucket can be replaced quickly with fork lifts, special buckets or crane hook for other jobs. Bucket suspends in low traveling position to afford complete forward visibility. Location of boom arms up front protects operator during lift action and gives him "full circle" visibility. Gasoline-powered, the unit has a maximum travel speed of 14 mph, with four forward speeds and one reverse speed. For inside work, special catalytic equipment is available to eliminate dangerous exhaust gases. Spark arresting muffler and Protectoseal fuel tank are standard equipment.

For More Details Circle No. 11—Page 283

IF IT'S A VALVE
FOR FOUNDRY WORK—
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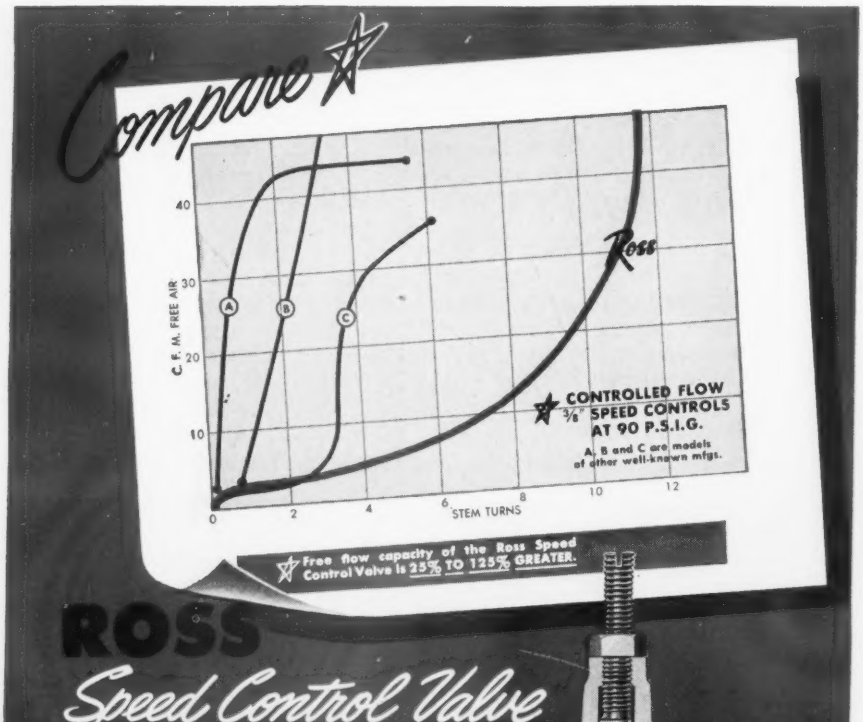
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als. For foundry use, larger sizes provide a moving table for sorting castings. Perforated pans can be furnished for quench tank service. These conveyors will carry materials horizontally, up and down inclines as steep as 45 degrees or in a combination of such paths. Pans are available in widths from 12 to 48 in. and can be made in steel, stainless steel, aluminum or other materials. Apron lines can be driven by full chain and rollers on both sides, by half chain and rollers on both sides, by outboard rollers without chains, and without chains and rollers.

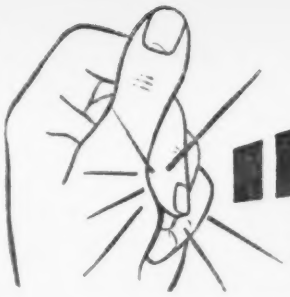
For More Details Circle No. 12—Page 283

Grinding Hand Tools: Newage International Inc., 235 East 42nd St., New York 17—Hand air turbine grinder and miller for grinding, milling and polishing operations comes in three sizes for speeds to 55,000, 70,000 and 85,000 rpm. For use on a variety of metals, including heat treated steels and tungsten carbide, it is said to give fast performance on molds, press tools, jigs and other pieces. The heavy-duty tool can perform internal, external and thread grinding. Spindle speeds of all three can be varied quickly and endlessly over their complete range. Air from the turbine cools both the bearings and the cutting tool. Tools are designed for operation on air pressure from 60 to 100 psi, and special orders will be accepted for operation down to 30 psi.

For More Details Circle No. 13—Page 283

Sprinkler Extinguishers: Stop-Fire Inc., 125 Ashland Place, Brooklyn 1, N. Y.—Automatic, sprinkler type fire extinguishers that are suspended from hooks in the ceiling require no piping and can be placed where they are needed most. They are stored pressure, vaporizing liquid extinguishers with 1-gal extinguishant capacity. Standard units, approved by Underwriters' Laboratories Inc., are pressurized at 80 psi with carbon dioxide and are charged with CBM (chlorobromomethane). When the temperature reaches the melting point of a fusible element in the sprinkler head, the extinguisher in-

(*Continued on page* 285)



IDEAS FOR FOUNDRYMEN

HERE ARE QUICK REVIEWS OF NEW LITERATURE—available to foundrymen as "idea" and reference information. Readers in the United States and Canada may obtain copies by using the attached cards. Readers in foreign countries should write direct to the manufacturer offering literature.

71. Lubricating Oil Agent

National Lead Co., Baroid Sales Div.—Bentone 34 gelling agent for lubricating oil—what it is, physical properties, how it is made, how it gels, how Bentone greases are made, manufacturing advantages, properties—are covered in detail in 16-page illustrated booklet.

72. Reverberatory Furnaces

Reda Pump Co., Furnace Div.—General information and specifications on 400, 550 and 1000 series melting furnaces for ferrous and nonferrous alloys are found in 4-page illustrated folder. Typical daily melt record, refractory performance and fuel consumption are given.

73. Core Wash

Delta Oil Products Co.—"Hi-Temp Wash" is title of 4-page data bulletin giving applicating procedures and properties of Delta wash for either baked or green cores. It is designed for use in steel, gray iron and malleable foundries and will not fuse or sinter below 3200° F.

74. Core Sand Binder

Masonite Corp., Chemical Div.—"Masonoid Dry Binder in Foundry Core Sands" is title of 10-page technical manual CD No. 3. Complete description, use methods and foundry formulation for steel, gray and malleable iron and nonferrous metals are covered. It is used as a partial replacement and extender for core oils and in some cases as a complete binder.

75. Bin Aerator

Bin-Dicator Co.—Designed to keep pulverized materials flowing freely in bins and hoppers, Bin-Flo aerator restores air which has been lost through storage and during use. Installation instruction sheet and 4-page illustrated form No. BF-1 give complete details on units, which require from 3 to 7 cfm air at pressures from 1 to 5 psi.

76. Foundry Equipment

Foundry Flask & Equipment Co.—Foundry flasks, pins, bushings, gages and automation equipment such as transfer devices and other handling fixtures are illustrated and briefly described in 4-page bulletin. They are typical of a line of company products also including wear plates, fixtures, baskets and boxes.

77. Ovens

Michigan Oven Co.—Horizontal air recirculation foundry ovens covered in 4-page illustrated bulletin 1152 include car or rack, conveyor core and roller drawer types. Space-saving mounting features, simply engineered control panels, fast baking, temperature uniformity and other characteristics are outlined.

78. Metal Abrasives

Metals Disintegrating Co., Harrison Abrasive Div.—Recommended uses for the various types of cast shot and grit are presented in 4-page bulletin 521. Cast shot numbers and screening tolerances as well as production specifications for ferrous materials are also given.

79. Industrial Tires

Harmo Tire & Rubber Corp.—Extensive line of earth mover and grader tires, tubes and wheels is described and illustrated in 16-page bulletin. Tire size and conversion table is included and prices are given.

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80. Measurement & Control

Leeds & Northrup Co.—46-page illustrated catalog ND46(1) is devoted to Speedomax Type G instruments for measurement and control of process variables. Literature covers variety of instruments, their construction features, a manually-switched indicator, round and strip-charts, control equipment, accessories and supplies. Instruments measure temperature, ac and dc electrical quantities, light, chemical concentration, gases and physical quantities.

81. Tractor Shovel

Tractomotive Corp.—How the model HD-5G Tracto-Shovel can be adapted to a wide variety of handling operations through use of quick-change attachments is told in well-illustrated form 891. Specifications and design features are shown. Attachments include various types of buckets, forks, a snow plow, dozers, a trench hoe and crane hook.

82. Flask Guides

Goehringer Foundry Supply Co.—Description and illustrations of Tru-Lift flask guides and match plate lugs are found in 4-page folder. Close fitting union provided by equipment prevents shifts and permits a straight vertical lifting of cope and removal of match plate.

83. Core Box Vents

Andrea Mfg. Co.—Four types of vents for core boxes are illustrated and specified in 4-page folder. Sizes range from ¼ to 1 in. Prices are given.

84. Annealing Malleable Iron

General Electric Co.—12-page bulletin GEA-5797 discusses the many problems involved in annealing malleable iron today and illustrates how G-E has applied continuous and batch-type electric furnaces to solve these problems economically. Roller-hearth and pusher tray furnaces are considered as well.

85. Core Oils

Swan-Finch Oil Corp.—Advantages of using Safco core oils in casting operations are pointed up in 4-page illustrated folder. Low core and casting losses, reduced shake-out time, decreased baking time, reduced core gas and smoke and elimination of core-box sticking are among advantages considered.

86. Cutoff Machine, Grinders

Fox Grinders, Inc.—Brief description and specifications are presented in 4-page folder on the Fox high speed swing frame cutoff machine and swing frame grinders. Stand grinders available in four sizes are considered as well. Swing frame machines have full maneuverability through 180 degrees.

87. Core Sand Mixers

Muller Machinery Co.—Specifications and prices for the Muller core sand mixer line are found in 4-page illustrated bulletin A-22. Models available have capacities of 3½, 6, 6-8 and 9 cu ft. Testimonials are given.

IMPORTANT READING FOR FOUNDRYMEN
We have a limited quantity of the following reprints which we can furnish while they last.

88. Foundry Industry Progress

"A Special Report on Foundry Industry Progress . . ." is a FOUNDRY reprint presenting discussions by industry leaders on subjects relating to the past and present of the industry and to its future potential. Articles are "Progress in Castings," "Gray Iron Castings," "Aluminum Castings," "Steel Castings," "Brass & Bronze Castings," "Malleable Iron Castings" and "Magnesium Castings."

89. Coke in the Cupola

Tests intended to evaluate the behaviour of coke in the cupola are described in reprint entitled "Coke Quality and Carbon Pickup." The author, C. R. Austin of Meehanite Metal Corp. gives particular emphasis to its carburization power, or the facility with which the carbon passes into solution with molten iron.

90. Al-Ni Bronze Castings

"Production of Aluminum-Nickel Bronze Sand Castings" authored by Vincent DePierre and Richard C. Wynne details equipment and procedures used in the production of these castings at the U. S. Naval Gun Factory. Reprint of a FOUNDRY article gives thorough consideration to production practices employed and to scope of work.

91. Shell Molding

Shell molding development work in International Harvester's research foundry is covered in "Shell Molding," compiled from two FOUNDRY articles. In addition to discussing in detail the process itself, the author outlines equipment requirements for both relatively large production setups and experimental work. Types of shell making machines available and a production layout are covered.

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16	33	50	67	84	101	118	135	152	169
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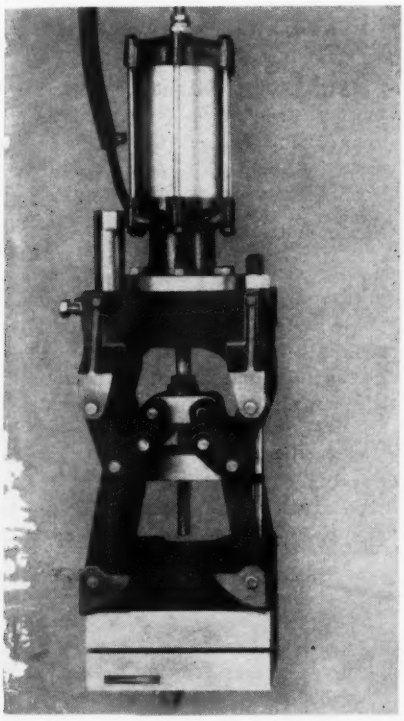
(*Continued from page* 282)

stantly discharges a foglike spray. Sprinkler head can be matched for operation of the unit at any specified temperature.

For More Details Circle No. 14—Page 283

Die Casting Machine: DCMT Sales Corp., 164 Duane St., New York 13—Independent die unit enables die casting machine operator to lift unit and die completely off the machine,



install a spare die unit which already has the die mounted on it and be back in operation within two or three minutes. Manufacturer states that the combination of continuous operation made possible by the die unit and the machine's high cycling speed of 800 to 1000 shots per hour permits use of low-cost single or two-cavity dies. In order to hold the shot of the unit's impact injection, the toggles themselves have been redesigned and made more massive. The lock now is 24,000 lb.

For More Details Circle No. 15—Page 283

Exhaust Fans: Dependable Machinery Co., Greensboro, N. C.—Industrial exhaust fans feature high-grade steel construction and are designed so that they can be rearranged in any position desired after removal of a few bolts. Housing then is rotated to the desired position and the bolts replaced. Heavy-duty, dust-proof, ball bearings are both on same side, where dust and grit cannot reach them. Blades of the blast wheels have extra-heavy braces, and each blade is welded into a machined steel hub. Fan sizes from 20 to 80 in. are available, with either standard or slow-

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speed wheels. Capacities range from 3690 to 26,700 cfm for the latter and 1325 to 26,700 cfm for the standard model.

For More Details Circle No. 16—Page 283

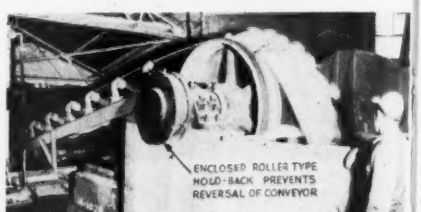
Maintenance Lift: Service Caster & Truck Corp., Somerville, Mass. Lifting unit on which a man can raise and lower himself with a hand crank has 500-lb capacity. Platform is 36 x 60 in. and has removable pipe railings. A hand winch is mounted on the carriage. The unit has caster steer, and a foot-operated floor lock is mounted between the swivel casters. Lifters are available with lifts of 5 ft or more and with or without pipe lowering hinges to permit passage through doorways.

For More Details Circle No. 17—Page 283

Silicone Release Agents: Linde Air Products Co., Division of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17—Silicones especially designed as shell molding release agents are made in three types—an extremely stable emulsion stock, a ready-to-use solution and a modified silicone for users who prefer to make up parting solutions in their own plants. The first is the generally recommended type. Prepared by being mixed with tap water in a clean container, it is said to provide excellent pattern release, low pattern buildup, economy and freedom from emulsion breakdown. Solutions similar to the first can be made by mixing 5 per cent of the modified silicone stock in a low aromatic hydrocarbon solvent such as mineral spirits.

For More Details Circle No. 18—Page 283

Hold-Back: Standard Products Division, Stephens-Adamson Mfg. Co., Aurora, Ill.—Designed to prevent reversal of bucket elevators and inclined conveyors due to power failure under load, roller type hold-back consists of an inner member, with wedge pockets for six hardened rollers, which rotates with the shaft. Rollers wedge against an outer cylinder when the shaft attempts to reverse. Pressure springs and plungers are claimed to guarantee instant engagement of the rollers. Hold-back releases as soon as forward motion of the shaft is resumed. It mounts directly on the drive shaft. Torque arm is bolted to a support with sufficient strength to



resist the load exerted when reversal occurs. Maximum torque resistance ranges up to 350,000 lb for units with a maximum bore of 7 in.

For More Details Circle No. 19—Page 283

Fan-Cooled Motor: Reuland Electric Co., Alhambra, Calif.—Greater cooling capacity of motors which incorporate high-velocity internal cooling fans permits them to obtain high horsepower ratings from lower cost, small frame sizes. This design also achieves considerable compactness. Fan-cooled motors are available in ratings from 15 through 30 hp. All units feature dripproof construction and can be furnished with either a standard single-end shaft or with special hydraulic pump mount end-bells.

For More Details Circle No. 20—Page 283

Tip Temples: Chicago Eye Shield Co., 2300 West Warren Blvd., Chicago —Symmetrical tip temples for the company's standard and side shield goggles are interchangeable, right or

SLY TUMBLING MILLS

THE STANDARD OF STURDINESS

The SLY name on your Tumbling Mills has been the Standard of Sturdiness for many years.

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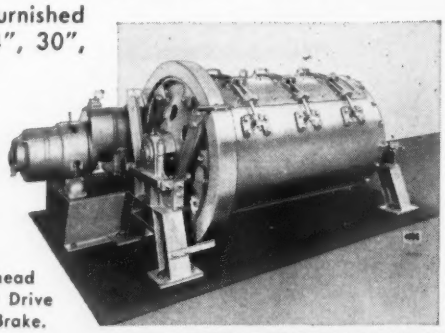
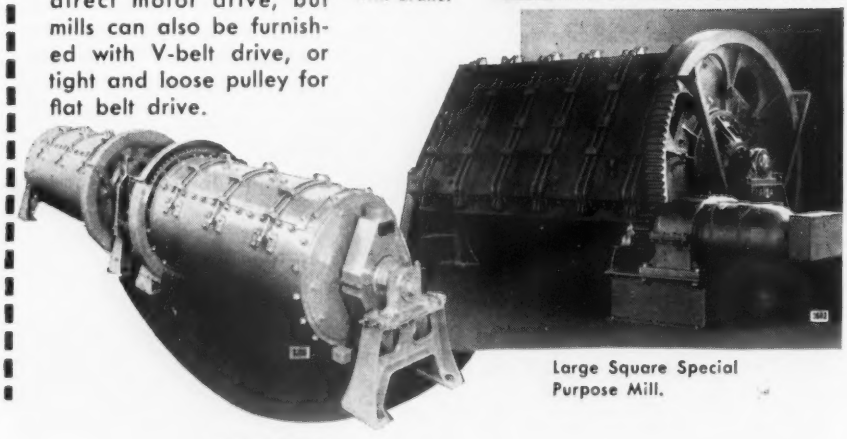


Gearhead Motor Drive with Brake.



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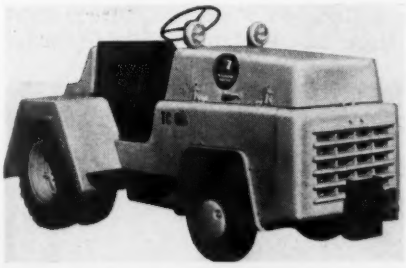
left. Tip is at a right angle to the flat bar, thus adding greater strength at the joint where breakage commonly occurs. Flesh colored extruded plastic insulator slides freely over the flexible shaft. End of insulator is closed so that the shaft cannot work through and scratch the back of the ear.

For More Details Circle No. 21—Page 283

Towing Tractor: Frank G. Hough Co., 703 Seventh St., Libertyville, Ill.—Refinements and modifications in the 1954 model of the company's towing tractor are claimed to contribute to greater ease of control, convenience and usefulness without sacrificing basic features. Dual range, full reversing transmission has been provided with a pushbutton controlled, solenoid vacuum actuated tailshaft brake which stops rotation of the transmission during shifting and enables gears to mesh quickly and quietly. Speed range lever and foot accelerator have been relocated for greater comfort and accessibility. Driver's seat is adjustable, and sides of machine have been lowered. Greater clearance has been provided between dual drive rear wheels and counterweighted fenders.



For More Details Circle No. 22—Page 283

Hydraulic Tracer: True-Trace Sales Corp., 2303 Chico Ave., El Monte, Calif.—Hydraulic tracer is said to convert a miller or other accurate metal cutting machine tool as much as 30 to 50 years old into a high precision, high production, three dimensional duplicator that assures tolerances to as close as from 0.005 to 0.0005 in. It traces 360 degrees in all directions, any combination of traverse, transverse and vertical motion being simultaneously controlled by one tracer spindle. Conversion material necessary beyond the tracer includes hydraulic power unit, hydraulic cylinder, mounting brackets and miscellaneous hydraulic lines and fittings.

For More Details Circle No. 23—Page 283

Plastic Safety Lenses: United States Safety Service Co., 1215 McGee, Kansas City 6, Mo.—New Line of safety lenses uses two types of plastic, one for long life and one where short lens life is expected. The first is unusually hard and offers superior scratch resistance at light weight. It is recommended for jobs where pitting and spatter are encountered. The second lens is very low in cost. Both are available in 6.00 curve, all clear, in sizes 44 mm or 47 mm drop oval and 50 mm round and will fit any standard industrial spectacle frame.

For More Details Circle No. 24—Page 283

Deadman Valve: Clementina Ltd., 2277 Jerrold Ave., San Francisco, Calif.—Remote control deadman valve for all types of sandblast machines is claimed to provide instant control of blasting at the nozzle head, to reduce manpower costs, and to insure complete on-the-job safety for workmen. Depressing a hand valve starts blasting, releasing the valve stops it. Resulting pressure drop opens a bleed-off valve in less than two seconds, completely releasing all pressure. An air intake valve, through which the pot is charged, is closed simultaneously so that no pressure can enter. If an accident should cause the operator to drop the nozzle,

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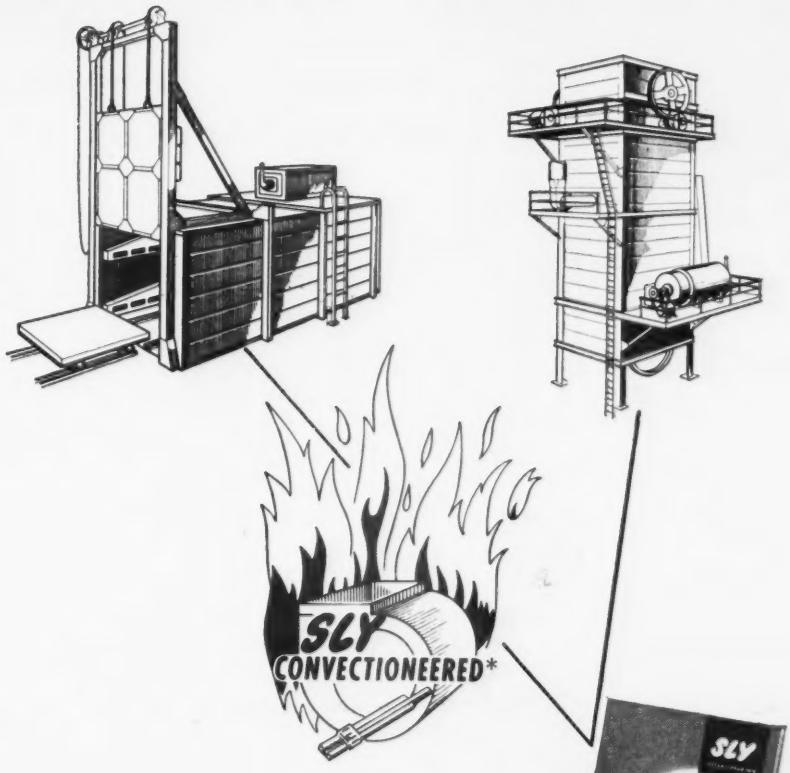

The solutions to your Industrial Oven and process heating problems can be found in this bulletin.

Your inquiries are solicited whether your requirements are for simple ovens or large complicated continuous systems.

For your copy of Bulletin 200 write or call.

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the deadman feature of the hand valve instantly stops the machine. A new unit can be installed in 15 minutes, with no electrical connections.

For More Details Circle No. 25—Page 283

Portable Power Hacksaw: LaRoy Industries Inc., 810 Fowler St., Howell, Mich.—Portable power hacksaw uses a mechanical motion that provides cutting action on the forward stroke of the blade and automatic lift and release of pressure on the return stroke. An automatic stop permits the operator to set the saw to the desired cut and attend to other work during the cutting operation. Ready to operate as a complete unit, it weighs 65 lb and requires no bolts or clamps to hold it to the bench. Quick action vise holds stock up to 2¾ in. and is easily adjustable to cut 15, 30 or 45 degree angles.

For More Details Circle No. 26—Page 283

Fluid Control: Fenwal Inc., Ashland, Mass.—Unit for air flow or liquid level detection or control has no exposed moving parts, is hermetically sealed and weighs less than ½-lb. Easy to install, it is reported to require no maintenance. Insensitive to the temperature of air flowing past it because it is ambient compensated, it gives practically instantaneous indication of a change in air flow above or below a desired value. Suggested applications include its use in air conditioning and dust collecting systems, in recirculating ovens and in foundry and paint room exhausts.

For More Details Circle No. 27—Page 283

Moisture Meter: Heyl & Patterson Inc., 55 Fort Pitt Blvd., Pittsburgh 22—Portable moisture meter

assertedly can determine surface moisture content in powdered, granulated or fibrous material in less than two minutes. Properly calibrated, it is said to be accurate to within 2 per cent of the surface moisture.

For More Details Circle No. 28—Page 283

Radiation Detector: Jordan Electronic Sales Inc., 119 East Union St., Pasadena, Calif.—Radiation detector for general purpose x-ray, industrial radiography and beta-gamma isotope monitoring has a built in Sr-90 calibration source which assertedly assures accuracy of at least plus or minus 10 per cent. A thin end window provides sensitive beta detection. Use of identical low voltage batteries, with 1 to 2-yr life under intermittent use, and of a simple circuit eliminates such components as high voltage supply, vibrators, transformers and hi-meg resistors. The detector weighs 3 lb and has one-knob control.

For More Details Circle No. 29—Page 283

Reflector Lamp: Amplex Corp., Dept. RP, 111 Water St., Brooklyn 1, N. Y.—Reflector lamp for industrial high bay lighting applications is said to do away with the need for auxiliary metal reflectors because it is a complete luminaire in itself and provides somewhat higher light output than the ordinary combination of lamp and separate reflector. Available in 500 and 750 w, it has a hermetically sealed internal reflector made of pure silver which is guaranteed to remain brilliant over the

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cutters change quicker

Longer life—by far—plus quicker, easier-than-ever cutter change are basic improvements in the patented, new type Desmond Huntington dressers. Supplied at no extra cost in No. 1, 2, 21, and 22 sizes. Note the new construction: hardened side washers, press fitted into head, positively secured with slotted hex head bolts and lock washers. Remove one bolt (with wrench or screw driver) to free spindle for quick cutter change.

Ask your Desmond industrial distributor for Bulletin D-48. He can help make your grinding wheels perform better—longer—with proper dressing.

Desmond-Stephan Mfg. Co., Urbana, O.

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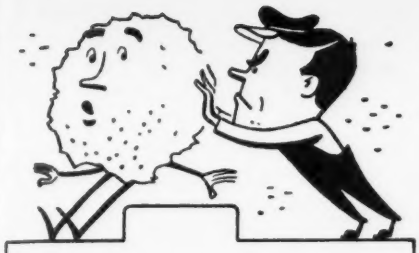

The case of the hesitant sand...

Yes, a New England foundry really did have a case like this. As the sand started down through the overhead bins and hoppers, it paused uncertainly, sort of reared back and held up production something terrible.

Fortunately, the foundry superintendent called us for advice. In short order a battery of CLEVELAND vibrators were installed on the bins, and the sand hasn't hesitated ever since.

Whatever your hesitant material . . . cement, steel chips, ore . . . just tell us — or ask for our detailed literature.

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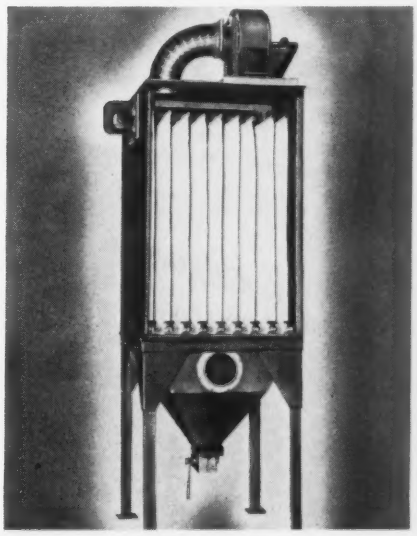
life span of the lamp, which is rated at 2000 hours. Design prevents dust and grime from settling on the under surface of the lamp and obscuring light emission.

For More Details Circle No. 30—Page 283

Vacuum Machine: Hild Floor Machine Co., 740 West Washington Blvd., Chicago 6—Vacuum machine for heavy-duty, dry clean-up work is powered with ⅝-hp vacuum motor with turbine fan design. Control of airstream is said to throw picked up dirt against sides of dust container, thus minimizing clogging of internal fabric air filter. Manufacturer claims that the machine tracks perfectly at the slightest pull on the hose, even when pulled across obstructions. Tools for use with the machine have swivel connections. Unit can be converted to a blower instantly. It weighs 52 lb and operates on 115 v alternating or direct current.

For More Details Circle No. 31—Page 283

Dust Collector: Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Md.—Unit type cloth bag dust collector for indoor use on small-volume applications accumulates finely divided dusts. Cleaned air frequently can be discharged inside the plant. Cloth bags are made of heavy weight,



sateen weave, cotton filter fabric stitched vertically to form multiple tubes. Casings are constructed of heavy-gage steel. Seven sizes are available, ranging from 200 to 1000 sq ft of cloth area.

For More Details Circle No. 32—Page 283

Folding Racks: American Metal Products Co., 5959 Linsdale Ave., Detroit 4—Ends of portable, self-stacking rack fold inside the rack frame when the rack is empty or being shipped. When the rack is to be put into use again, the ends are swung up and locked in a vertical position.

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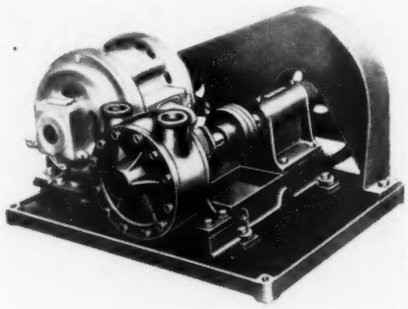
Racks are made in a wide range of sizes and are capable of carrying loads of 3000 to 5000 lb. They can be stacked six tiers high while loaded to their full limit. Floors of plywood, board or sheet steel are available.
For More Details Circle No. 33—Page 283

Relief Valve: Eclipse Fuel Engineering Co., Rockford, Ill.—Piston-type, oil relief valve for regulating



pressure on the firm's new series of closed flame gas-oil burners is reported to do away with objectionable chattering and pulsation. A cylindrical steel piston closes the port with a quick, positive shearing action that eliminates pounding noise. Pressure is regulated closely by tension adjustments on the spring inside the piston. Five different spring sizes permit a wide range of pressures from 0 to 500 lb. Valve piston and spring are easily removed for field servicing without dismantling the entire valve. These relief valves are available in four sizes with from ⅜ to 1-in. ports.
For More Details Circle No. 34—Page 283

Vibrators: Vibron Division, Burgess-Sterbentz Corp., 3790 West 150th St., Cleveland 11—Line of heavy-duty, quiet-action, nonimpacting vibrators is designed to make inert bulk materials flow freely without noise. In addition to preventing arching and clogging, they are reported to eliminate air pockets and voids, thereby increasing carrying capacity of containers. Vibration is achieved by a reciprocating piston and ranges up to 5000 vibrations per minute. Effective operating air pressure is claimed to be increased from 30 to 60 per cent above supply pressure. Vibrators are available in a wide range of sizes with capacities to move bulk materials up to 30 tons.
For More Details Circle No. 35—Page 283

Gamma Ray Fluoroscope: Radioactive Products Inc., 443 West Congress St., Detroit 26—Fluoroscope uses a radioactive source which consists of three pellets of cobalt metal 1 cm in diam and 1 cm long. Irradiated in an Atomic Energy Commission nuclear reactor, these pellets radiate 4 watts of gamma rays day

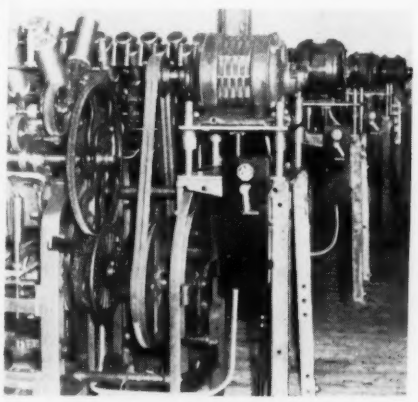
and night at a cost of ½ cent per watt hour and will continue to do so indefinitely at a gradually decreasing rate. Radiations are penetrating enough that only half of them is absorbed when they pass through ¾-in. of steel. The instrument itself is 7 ft high and contains the source in a steel-cased cylindrical shield 18 in. in diam.

For More Details Circle No. 36—Page 283

Shaker Conveyors: Goodman Mfg. Co., Dept. IMD-22, Halsted and 48th Sts., Chicago 9—Shaker conveyors for conveying operations involving hot or abrasive materials move materials horizontally, up or down for distances up to 500 ft. Although constructed for heavy duty, they are lightweight and portable and can be quickly assembled. Normal capacity is 100 tons per hour. Powered by 10, 15 or 20-hp electric motors or by 10 or 25-hp air motors, these conveyors can be supplied with trough sections ranging from 12 to 36-in. widths, 6 to 16-ft lengths and 6 to 18-in. depths. Angle sections are available for operations in which the trough line turns.

For More Details Circle No. 37—Page 283

Motor Base: Quintin J. Kearney, 220 Congress Ave., Lansdowne, Pa.—LMV motor base with 6-in. vertical adjustment is said to save floor and machine space and to provide adjustment needed when driving wheels that operate with endless belts or chains are changed. Vertical motion is great enough for use with spring loaded type of variable speed motor pulley. Constructed entirely of fabricated steel, base shown accommodates electric motor frame 284—7½ hp at 1800 rpm, 5 hp at 1200 rpm or 3 hp at 900 rpm. Center adjusting screws can be shortened if full 6-in. movement is not necessary.



For More Details Circle No. 38—Page 283

Portable Dust Bin: Torit Mfg. Co., 301 Walnut St., St. Paul 2—Optional equipment for the firm's Model 219 dust separator, a portable

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WHERE TO BUY IT

ATLANTA, GA.
Guardian Safety Equipment Co.
427½ Moreland Avenue, N. E.

BIRMINGHAM, ALA.
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BOSTON, MASS.
General Equipment Corporation
261 Franklin Street

BUFFALO, N. Y.
The Watson Company
1443 Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 Diversey

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
851 Williams Avenue

DALLAS, TEXAS
Guardian Safety Equipment Co.
900 Jefferson Tower Bldg.

DETROIT, MICH.
Averill Equipment Company
19225 Conant Avenue

EAST ORANGE, N. J.
Guardian Safety Equipment Co.
491 Prospect Street

HOUSTON, TEXAS
Guardian Safety Equipment Co
1915 A Westheimer

INDIANAPOLIS, IND.
Averill Equipment Company
1917 North Goodlett

KANSAS CITY, MO.
Safety, Incorporated
17½ E. 31st Street

KNOXVILLE, TENN.
Safety Equipment Distributing Co.
832 W. Main Street

LITTLE ROCK, ARK.
Fire Appliance & Safety Co.
1114 W. Markham

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7223 S. Main Street

LOUISVILLE, KENTUCKY
Williams & Co., Inc.
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MILWAUKEE, WIS.
Universal Safety Equipment Co.
3155 S. 7th Street

PEORIA, ILL.
Universal Safety Equipment Co.
116 S. Garfield

PHILADELPHIA, PA.
Guardian Safety Equipment Co.
214 S. 45th Street

PITTSBURGH, PA.
Williams & Co., Inc
901 Pennsylvania Avenue

ST. LOUIS, MO.
Safety, Inc.
2608 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
1551 Selby Ave

SALT LAKE CITY, UTAH
Universal Fire & Safety
Equipment Co., Box 1587

SAN FRANCISCO, CALIF.
Guardian Safety Equipment Co
50 Hawthorne Street

SPOKANE, WASH.
Spokane Safety Appliances
W. 314 Pacific Ave.

TOLEDO, OHIO
Williams & Co., Inc.
650 E. Woodruff Avenue

TULSA, OKLA.
Guardian Safety Equipment Co.
1742 S. Main Street

WICHITA, KANS.
Guardian Safety Equipment Co.
723 S. Broadway

MEXICO CITY, D. F.
Safety Equipment S. A.
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dust bin is intended for use where large volumes of dust require frequent emptying of the dust reservoir for disposal or salvage. Its use requires that the separator be mounted on legs and equipped with a hopper bottom. From this hopper, a 12-in.-diam airtight flexible sleeve leads to a lid that clamps onto the bin.

For More Details Circle No. 39—Page 283

Firebrick: Zonolite Co., 135 South LaSalle St., Chicago 3—Vermiculite insulating firebrick is reported to increase checker chamber efficiency and to eliminate hot metal splash buildup. Greater checker chamber efficiency is attributed to higher checker temperatures, more efficient checker operation, lowered fuel costs and reduced maintenance. It forms only the outside checker chamber course. Also used only as the outer veneer course, the brick is said to eliminate metal splash buildup in areas where it ordinarily occurs because of its smoothness and lightness. The brick is laid up either dry or with heat setting mortar.

For More Details Circle No. 40—Page 283

Beat Up Hoppers Cost You Time and Money!

GET FREE-FLOWING, NON-STICKING SAND FROM ANY MIX

With

MABCO Release Agent "G"

At Last M. A. Bell Company has developed a sure-fire method of freeing sticky core and molding sand in your hoppers. Only one-quarter pound of MABCO Release Agent "G" is required to eliminate stickiness in 100 pounds of sand.

Fine For Blowing Cores Made With Synthetic Binders

One-half pound of MABCO Release Agent "G" with 100 pounds of core sand will allow you to strip cores cleanly from box with no rapping.

Write today for free Bulletin RA250 giving full details on how you can try the amazing MABCO Release Agent "G" in your foundry at no risk to you.

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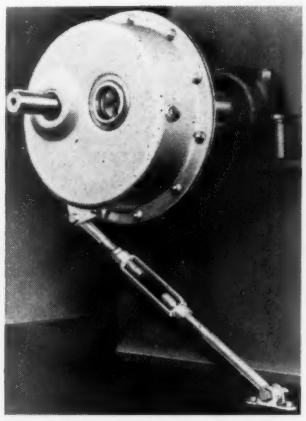
HOUSTON DENVER

Speed Reducer: Falk Corp., 3001 West Canal St., Milwaukee 8—Speed reducer mounts directly on the shaft to be driven and requires no floor space other than that needed for the motor and tie rod connections. Said to be easily adaptable to various driven shaft diameters, the drive offers comparatively high ratios of



speed reduction in limited space. Choice of single or double reduction unit permits selection of almost any output speed between 14 and 420 rpm by changes in sheave sizes within allowable limits. Six sizes cover the range from ½ to 30 hp.

For More Details Circle No. 41—Page 283

Power Steering: Towmotor Corp. Div. 7501, 1226 East 152nd St., Cleveland 10 — Power steering now is available in fork lift trucks manufactured by the company. It offers essentially the same advantages as power steering in passenger cars. Turning at low speeds is quick and easy. A full turn of the wheels from sharp right to sharp left can be made in 5 seconds with steering effort reduced 80 per cent. In addition, wear and tear on the steering gear and drag link is reported to be decreased.

For More Details Circle No. 42—Page 283

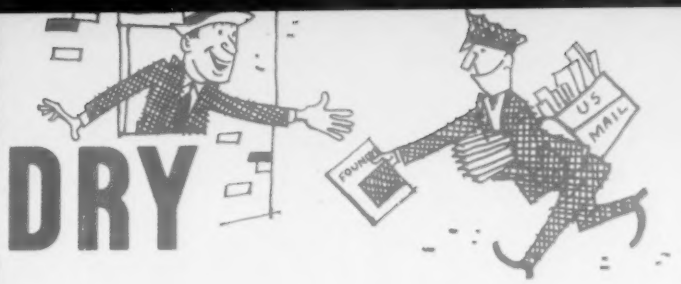
Exhaust Fans: M & E Mfg. Co., 2531 Winthrop Ave., Indianapolis 5—Sheet metal exhaust unit is for installation in existing windows or concrete block walls in areas where hazardous fumes must be exhausted. Motor is accessible for inspection and maintenance from inside by an access door and is protected from weather by a protective sheet metal cover on the exterior of the building. Incorporating the unit with one of the company's exhaust fans is said to assure meeting fire insurance standards for hazardous locations.

For More Details Circle No. 43—Page 283

Tool Grinder: DoAll Co., 254 North Laurel Ave., Des Plaines, Ill. —Tool and drill grinder points and sharpens twist drills from No. 60

ease send me

FOUNDRY



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wire size to ¾ in. It permits grinding of point angles from 45 to 75 degrees, clearance angles from 6 to 15 degrees and chisel point angles from 117 to 135 degrees. Drills are held and positioned in a fixture which simplifies setting of angles. Grinder incorporates a ¼-hp ball bearing motor and is equipped with a rough wheel for grinding tools down rapidly to aproximate angles prior to accurate finishing on the other wheel, using the fixture.

For More Details Circle No. 44—Page 283

Resin Core Binder: E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33—Liquid phenolic resin core binder is said to make possible cores of dependable tensile strength, good surface hardness and long shelf life, with complete bakeout in a short, economical baking cycle. Free of burned sand and scale, they resist penetration or burn-in from hot metal, according to the manufacturer. The resin is a thermosetting core binder which produces best results when used in controlled baking temperatures of from 400 to 450° F.

For More Details Circle No. 45—Page 283

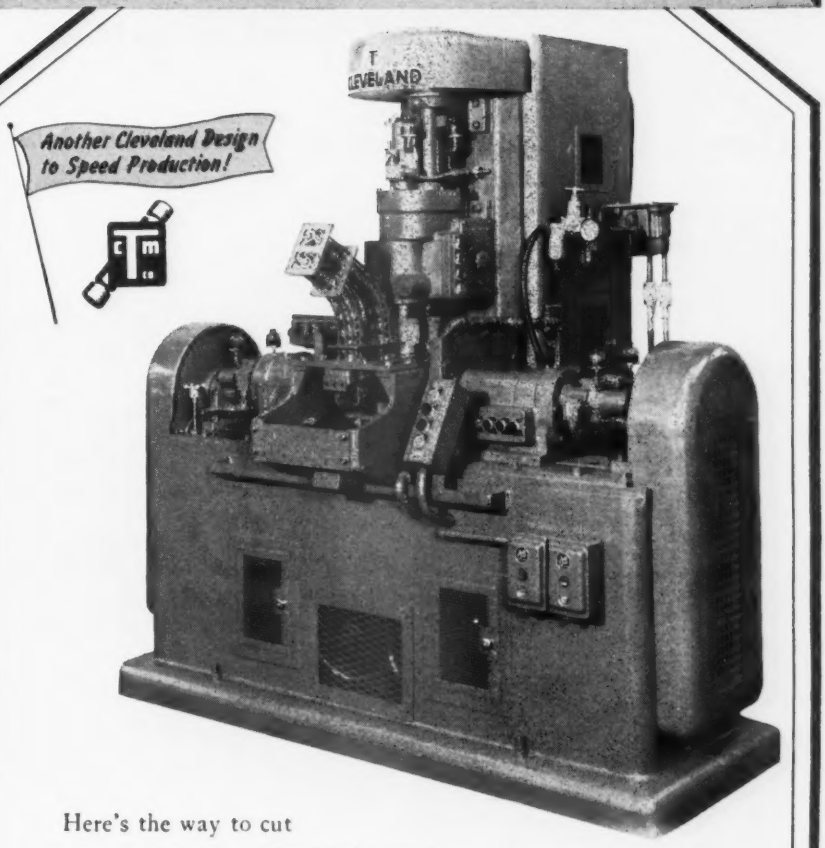
Speed Balance: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Semiautomatic balance fea-

turing fast, convenient weighing has a deflection scale reading up to 10 grams, capacity of 1000 grams and sensitivity of 20 mg. A direct moisture scale speeds determination of moisture. An equal arm beam and dead beat damping insure quick reading and reliable accuracy.

For More Details Circle No. 46—Page 283

Photocopying Papers: Peerless Photo Products Inc., Shoreham, Long Island, N. Y.—Dry process photocopying papers used with a single processing solution produce prints with black copy on a white background. Anything that is legible on

1308 tee fittings per hour!



Here's the way to cut costs on tee fittings! This Model FT-1 will tap 1308 pieces ½" - 14 per hour at 100% efficiency. Also handles ¾" and 1" sizes. All spindles have their own lead screw feed—assuring the precision for which Cleveland Fitting Machines are famous. Produced parts are square and within the required tolerances. Set-up and change-over time is reduced and tap life increased up to 25%. For greater efficiency this Model may be grouped in batteries of three with one operator to each battery.

If you make fittings of any size or type it will pay you to consult Cleveland engineers. Their know-how can save you money.

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A Subsidiary of **AUTOMATIC STEEL PRODUCTS, INC.**

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CLEVELAND lead screw **fittings machines**

the original—including penciled notations, colored ink or crayon markings, stenciled or spirit-process duplicated copy—will be readable on the reproduction, according to the manufacturer. Several types of paper are available.

For More Details Circle No. 47—Page 283

Gray Iron Welding: Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, New York, N. Y.—Electrode with specially designed coating has been developed for welding cast iron. Advantages are said to include elimination of cracking and cross-checking; dense, high tensile, color matching, machinable deposits; and perfectly controlled burn-off rate. A $\frac{1}{8}$-in. electrode operates on 35 to 75 amp. Arc length is not as critical as usual, and welding can be done from any position.

For More Details Circle No. 48—Page 283

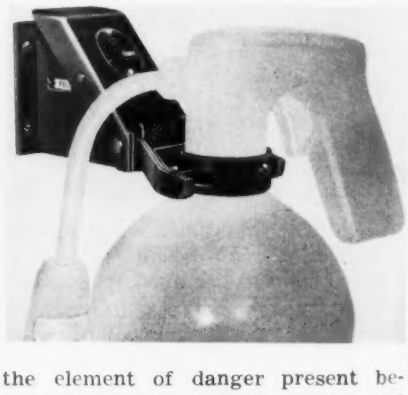
Magnesium Yard Ramp: Penco Engineering Co., 25 California St., San Francisco 11—Movable by one man, yard ramp is built of lightweight magnesium raised diamond surface plate. It is made in two sizes, 60 and 70 in. wide, and in six capacities, from 4000 to 16,000 lb, with either fixed wheels or hydraulic lift and is adjustable within 38 to 55-in range. It features a curved side rail the entire length of the ramp on both sides.

For More Details Circle No. 49—Page 283

Shell Molding: Acme Resin Corp., 1401 Circle Ave., Forest Park, Ill.—Liquid resin and a newly developed process for shell molding by dump box, rollover and blowing methods are claimed to reduce shell molding cost, improve mold uniformity, reduce proportion of resin needed, produce coated sand free from dust, prevent separation of resin and sand and to simplify coating operation. Process consists of charging cold, dry sand into a muller and adding liquid resin and a catalyst in prescribed amounts, depending on ultimate use of the coated sand. Uniform resin distribution is said to give good hot strength characteristics to the mixture, which is reported to be flowable, free of agglomerates, stable and without susceptibility to variations in temperature and humidity. Its flowability permits low air pressure blowing, which in turn results in uniform packing of sand around pattern contours, without ram-away. The mixture can be processed and stored in advance of its use.

For More Details Circle No. 50—Page 283

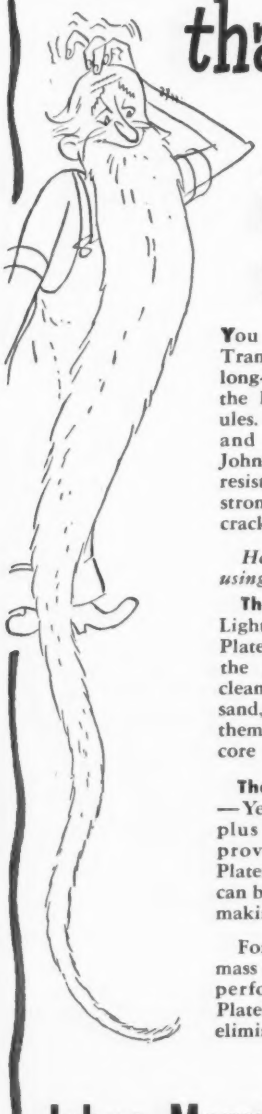
Fire Safety Device: Mel-Rod Mfg. Co., 11616 Hart St., North Hollywood, Calif. — Fire safety device serves as a mounting bracket and as a continuous weigher for all standard CO_2 extinguishers. It eliminates



the element of danger present between periodic manual checks and does away with the expense of manual inspection and weighing. When a fully charged bottle of CO_2 is placed on the indicator, the unit is adjusted to an index mark with an ordinary screw driver. Indicator then constantly marks contents as full to empty. Unit is sealed against tampering after adjustment.

For More Details Circle No. 51—Page 283

Looking for core plates that LAST LONGER?



. . . then use TRANSITE CORE PLATES that stay on the job year in, year out

You can rely on durable Transite* Core Plates to give long-term service, even under the heaviest foundry schedules. Made of fibrous asbestos and cement, by a special Johns-Manville process, they resist shock and corrosion, are strong and durable, will not crack or break easily.

Here are more reasons for using Transite Core Plates:

They speed production—Light-weight Transite Core Plates are easier to handle on the job. They're easier to clean, too . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

They maintain accuracy—Years of foundry service, plus exhaustive tests, have proven that Transite Core Plates do not warp readily . . . can be used for precision core making indefinitely.

For core plates of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 60, New York 16, N. Y.

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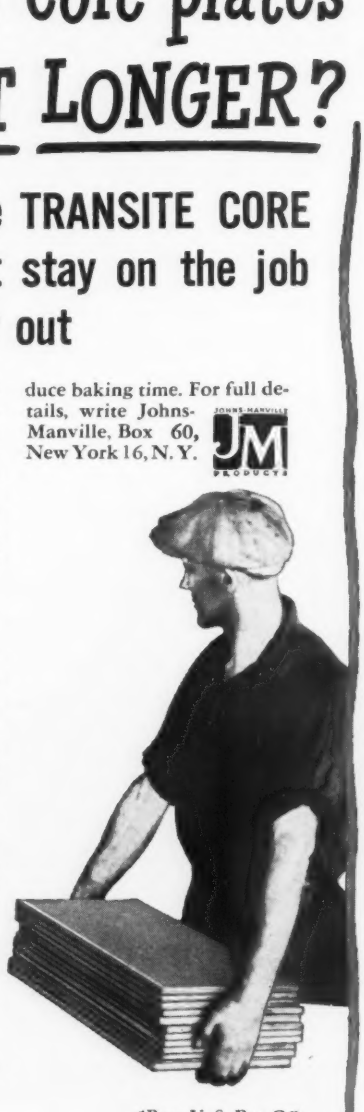

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

Fire Extinguishers: American-LaFrance Foamite Corp., Elmira, N. Y.—Line of hand portable fire extinguishers operates without pressurizing, inverting, bumping or use of a shutoff nozzle on the hose. Their use involves only pulling a pin and squeezing a lever. Discharge nozzle fans a dry chemical outward and downward in a wide pattern with great density.

For More Details Circle No. 52—Page 283

Safety Gloves: Fairfield Glove Co., Fairfield, Iowa—Industrial work gloves are available with safety slo-

gans printed on them according to customer specifications. Other slogans relate to maintenance, housekeeping, economy of materials and similar subjects. Printing is free.

For More Details Circle No. 53—Page 283

Metallizing: Emjay Maintenance Engineers, 327 Union Ave., Rutherford, N. J.—Material composed of finely pulverized aluminum in a plastic base makes possible metallizing surfaces with aluminum. Coating is applied twice, with a 4-hr drying time between applications, and hardens to a plastic bonded aluminum surface which can be polished, ground, drilled or bent to a 45-degree angle without chipping or cracking, according to the manufacturer. The substance has good resistance to atmospheric corrosion and retains its finish and adhesion over a wide range of temperatures.

For More Details Circle No. 54—Page 283

Pattern Coating: Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11—New pattern coating is said to give the effect of a parting because of its absence of stickiness. Advantages claimed for it are: High resistance to abrasion, moisture, core oils, kerosene, synthetic binders; excellent working qualities, adherence and penetration; pleasing odor; ability to dry over wax; unusually good appearance. No more than two coats are required. Known as Master Kincote, it is available in clear, clear orange, black, vermillion, yellow and aluminum colors.

For More Details Circle No. 55—Page 283

in vertical and horizontal grinders

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Or, better still, start looking for methods to improve product quality and reduce production costs. Like an Ohio foundry, where a test *proved* that a lighter, faster Buckeye portable grinder could do an even better job, in less time, at lower cost. And, as a "bonus," this grinder has been operating for more than two full years without any repair service required.

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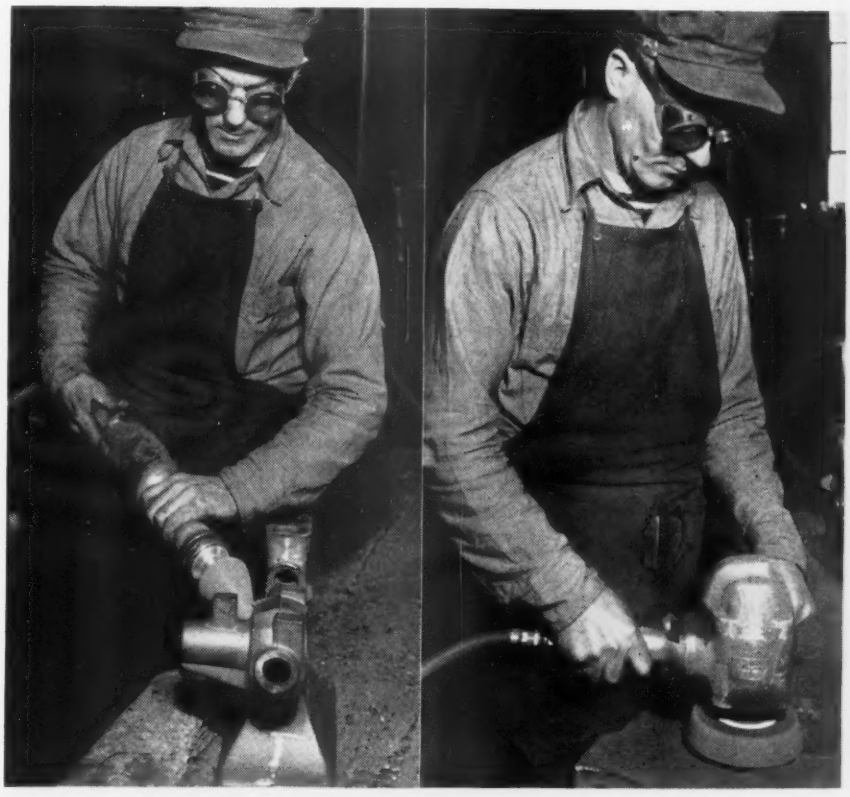
Getting into the corners is easy with this lightweight, maneuverable Buckeye horizontal grinder. Faster speed means less wear on cone wheels, too.

On jobs where large, relatively flat surfaces are worked, Buckeye vertical grinders help increase productive output, improve product quality.



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K-444

Electro Refractories & Abrasives

Research in England

(*Continued from page* 113)

represent the tools with which the problems are solved. If we are not ready to put the stamp of practical on basic research then, as yet, we have not developed to the point of knowing how to use these tools.

On another aspect of British research one finds a national pride in the method of approach to research problems. The method is often referred to as the "string and sealing wax" approach. This means simply that a great deal of careful analytical thinking should precede the actual experimentation which should be used primarily to "tie up and seal" the research job. In fact, there is an implied criticism that the American investigator does too little of this and is prone to rely on conducting a great number of experiments, hoping that the answer will automatically evolve.

Forced Into Careful Approach

The writer is not in a position to evaluate how closely the British approach follows the method described—it must be said, however, that a careful analytical approach was the case in a number of investigations which were discussed in detail during the visits. If our British friends are taken at their word that such is the usual case, and allowing for exceptions which prove the rule, it is of interest to take a look at ourselves.

It seems that the research man in this country usually works with limited funds and is forced to take a careful approach which automatically limits the number of experiments. In fact, we are indoctrinated in our schools to revere the principle of the "critical experiment" which means that careful consideration is given to arranging experiments which are critical tests of ideas or hypotheses. Within the crowd of research men the investigator who operates blindly by conducting experiments which are not carefully planned is of low stature indeed. It is concluded that there is very little difference in the research approach taken by capable research men in the two countries.

Perhaps this matter could be placed in better perspective by considering that the question probably has its basis in the common feeling of research men that many of the so-called practical papers are based on "buck shot" approach, entailing many tests conducted with poor scheme. The greater percentage of "practical" papers as compared to scientific papers which appear in our

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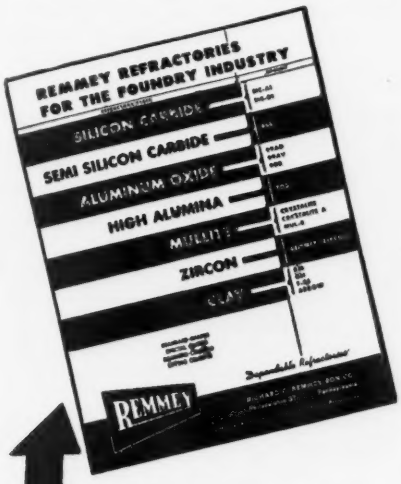

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foundry technical literature may seemingly indicate a greater reliance on the "buck shot" approach.

The Research Associations—The considerable attention to problems of broadening the base of foundry science, as well as solving immediate problems of production which is apparent from the British technical literature, is made possible by the organizational scheme of foundry research which has no close parallel in our system. The scheme is not unique to foundry research but is part of a broad organizational plan which encompasses practically all phases of technology. This is the scheme of unified research organizations called Research Associations, which operate in part by government grants under the auspices of the Department of Scientific and Industrial Research (DSIR).

There are approximately 40 such associations, which vary widely in size and method of operation. The British Cast Iron Research Association (BCIRA), British Non-Ferrous Metals Research Association (BNF MRA), and British Steel Castings Research Association (BSCRA) are part of this plan.

For purposes of illustrating the scope of the plan a few others may be cited: British Welding R.A., British Iron and Steel R.A. (both visited), British Ceramic R.A., Motor Industry R.A., British Coal Utilization R.A., British Cotton Industry R.A., British Hydromechanics R.A., British Paper and Board Industry R.A., Wool Industries R.A., British Food Manufacturing Industries R.A., etc. The Research Associations are not to be confused with Trade Associations, which also exist as in this country.

The common term "research" in the title of the various associations is most descriptive of their function, which is to further the technological growth of industry. It is not to be implied that the investigations conducted are all of the basic science variety; each association faces and meets its own problems of proportioning between science and development studies. However, the fact that a proportioning of the research effort to the development of a science is an essential part of the plan indicates a realistic, farsighted attitude of the value of such work. This is a far cry from the attitude that industrial groups should support only that which is optimistically referred to as "practical research."

While membership in the research associations is on a voluntary basis, the percentage of each industry which has joined the system is very high, attesting to the value of mem-

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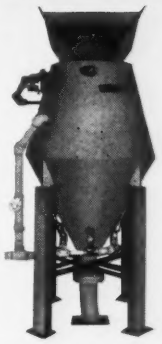

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bership. Membership fees are determined by the associations according to individual plans which best fit the industry in question. For example, the BSCRA fees are based on the production of carbon steel, while the BCIRA derives its fees from a levy on pig iron.

The government contributes funds through the Department of Scientific and Industrial Research on a basis of contracts which extend over a period of approximately 5 years. The government grants approximately 50 per cent of the sum collected from industry, making the total sum approximately two-third industry and one-third government money. The maximum government grant is approximately 150,000 pounds (roughly $420,000) in which case the industry collection must be a minimum of 300,000 pounds ($840,000). This collection was, in fact, exceeded in 1952 by the BISRA, the giant of the metal industries research associations. The government contribution scheme, however, is flexible and the actual percentage contributed by the government is set by the DSIR.

The total amount (government and industry) available for foundry research for the three foundry research associations is estimated (official DSIR publications are the basis for all fiscal quotations of this writing) to be approximately 210,000 pounds ($590,000). Due to differences in purchasing power and salaries, this sum is estimated to permit conducting research and development activities at a rate which would require an expenditure of almost $1,000,000 in this country.

It should be recognized that this does not represent the total expended by the British foundry industry for research and development, inasmuch as a great deal of private work is carried out in the industry as in this country. It represents only the sum expended in a collective effort by the foundry industry; no similar fund is available in this country for collective effort, particularly for basic research studies.

From the various official publications of the foundry research associations, reports of the DSIR and personal discussions with administrative officers it appears that approximately two-thirds of the funds are expended on research and one-third on free consulting service (to be described) —probably one-third of the research money goes to conducting work which is classed as development of a science in the strict sense of the word.

No Strings Attached—The grant by the government is without any strings attached. The workings of the association are reviewed by a small

committee of technical men from industry (assessors). A yearly report is made by the association to the government which is then condensed and presented in a summary "Report of the Year" by the Department of Scientific and Industrial Research as a government publication available to all.

The organization of the individual associations differs considerably; however, there is a common general scheme. Policy is determined by a group of industrial executives and trade association representatives serving on a Council, while the implementation of the policy is the function of research boards and committees of technical men from industry and the universities. The frequency of meetings and degree of review does not follow any set pattern. A full-time director is appointed for the purpose of supervising the research effort.

Staff Conducts Research

The work of the foundry research associations is conducted for the most part by the staff of the associations at their own laboratories. Special investigations may be contracted to university laboratories, usually in the case of theoretical studies. Large industrial research laboratories of private type such as Battelle Memorial Institute have not developed, probably because their function is met by the Research Associations.

The research associations publish the results of investigations as research reports available only to members and also as reports which are published in the general literature. In addition, reviews of various types are presented in concise form. Other services are provided such as translations of foreign articles and abstracts of papers of interest to the members.

A department in the BCIRA devoted to publishing, abstracting, translation, collection of general information into easy reference form, and answer to inquiries is officially termed the Intelligence Department, a fitting although surprising term to the uninitiated. Conferences, committee meetings and annual meetings serve to bring together the membership of the associations and to further their aims. Patents held by the associations may be used by members on terms designed by the governing councils of the associations.

Of particular interest is the "Operational Research" feature of the research associations which is promoted and encouraged by the DSIR. Its service is described in the DSIR Report to the Advisory Council as "no

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substitute for laboratory research, but it is often of particular value in showing where the latter can be most profitably directed. Its conduct gives the scientist the valuble experience that comes from meeting and working with all kinds of people in an industry, (it has) the great advantage of enabling better use to be made of existing machinery and labor." In brief, it is a free consulting service aimed at bringing the results of laboratory work to the foundry floor by direct contact between the laboratory man and the shop man.

This aim is well worth emphasizing, for all too often research work is buried in association literature or company files and round and round goes the argument as to who is to blame—the laboratory man who is content with the act of publication or the shop man who will not go to the effort of studying the reports. Basically, it appears to be the fault of management for not seeing to it that the two are brought together to understand each other.

The DSIR cites the BCIRA as having developed this system to a point of high efficiency as represented by their Operational Research Team (ORT) which on the basis of proven performance has the backing of the Council of Ironfoundry Associations (trade group). The BCIRA instituted the ORT system in 1950 with the object of "bringing the latest technical ideas to those who needed them." The team represents a group of experts of varied experience which is at the disposal of any foundry requesting help. The team visits only on invitation and works on a secrecy basis reporting only to the inviting firm.

The cost of the services of the team is met entirely by the BCIRA and the foundry visited is not charged in any way. The team surveys operations and makes recommendations to the foundry it visited. It does not, however, work out details connected with the recommendations; hence, the team is not considered as a substitute for consultants. In many cases use of consultants follows from the recommendations. The extent of the operations of the BCIRA, ORT team may be judged from a DSIR report of more than 200 foundry visits during the past two years.

Operational research activities are a part of the BNFMRA and the BSCRA activities. In fact, there is a general realization that the system is necessary for a successful working of the research association system.

Cast Iron Research—While British industry first began to organize on a national basis of federated associations in 1941, the British Cast Iron Research Association has been "active in the application of science to the problems of the iron founder" for approximately 33 years. The main offices and laboratories of the association are in Alvechurch near Birmingham. Laboratories are also located at Blantyre Estate near Glasgow. The funds available to the association during 1952 are reported by the DSIR to have been approximately 110,000 pounds ($300,000). At present the association membership numbers approximately 1300. The governing council consists of approximately 25 members representing the leading figures in the industry.

The research director, Dr. J. G. Pearce, and the research manager, H. Morrogh, are backed by an excellent staff which has at its disposal a well equipped laboratory. As is typical of the course taken by most research associations, the offices and part of the laboratories are located in the buildings of a former country estate. Such estates are obtainable in England at relatively low cost due to impact of high death taxes.

Extensions to the existing laboratories were added in 1952, comprising modern chemical and spectrographic laboratories, a sand laboratory and additional space for operational and foundry atmospheres studies. A new foundry building housing a modern, production-scale cupola is under construction. It was of interest to note that the country estate included a large garden and fruit orchard which supplied the excellent laboratory cafeteria with produce. There were no reports of complaints of duplicating effort by the Fruit and Vegetable Canning and Quick Freezing Research Association!

The research program includes studies of graphite formation, gases in cast iron, origin of enameling defects, application of direct reading spectrography, influence of properties of sands at high temperatures, fatigue and impact properties of cast irons, factors which influence casting soundness, control of chill, corrosion and cathodic protection, foundry atmospheres, and operational research concerned with foundry productivity.

Nonferrous Research—The British Non-Ferrous Metals Research Association covers a very wide field which includes extraction, wrought and cast metals. In this respect it is similar to the British Iron and Steel Research Association, which covers the ferrous field with the exception of steel castings. The BNFMRA has been active for approximately the same time as the BCIRA (34 years). The laboratories and main offices are located in London.

The income of the association is listed by the DSIR as approximately 112,000 pounds ($314,000), however, only a part of this income is expended directly on foundry research. Judged on the basis of DSIR reports the casting effort probably does not exceed one-fifth of the over-all activities of the association. When compared to the activity associated with cast iron research, nonferrous casting research is conducted on a relatively smaller scale. The membership, including all phases of the association's interest, is approximately 600.

The over-all research program of the association is supervised by G. L. Bailey as director and W. A. Baker as research manager. The Melting and Casting Section is under the capable supervision of R. W. Ruddle, well known to us for his various foundry articles. The foundry research program of the BNFRA has included studies of refractory linings for melting nonferrous metals, action of slags, grain refinement, foundry practices including risering and gating, degassing, and fundamental studies of solidification.

Steel Research—The British Steel Castings Research Association has recently achieved independent status. Formerly it was part of the huge British Iron and Steel Research Association (the size of which may be appreciated from its staff of nearly 400). As such it was a section of the BISRA in the same manner as the Melting and Casting section of the BNFMRA. The membership of the BSCRA represents a major fraction of cast steel production groups.

The director J. F. Jackson, is ably assisted by Dr. G. M. Michie and J. M. Middleton, who direct the efforts of a small research staff. Offices of the BSCRA are located in Sheffield, with limited laboratory space serving the immediate needs prior to the building of a research laboratory which is being planned. Much of the research work has been conducted under contract with universities because of the limitations of present laboratory facilities.

The research program has included hot tearing (the excellent work of

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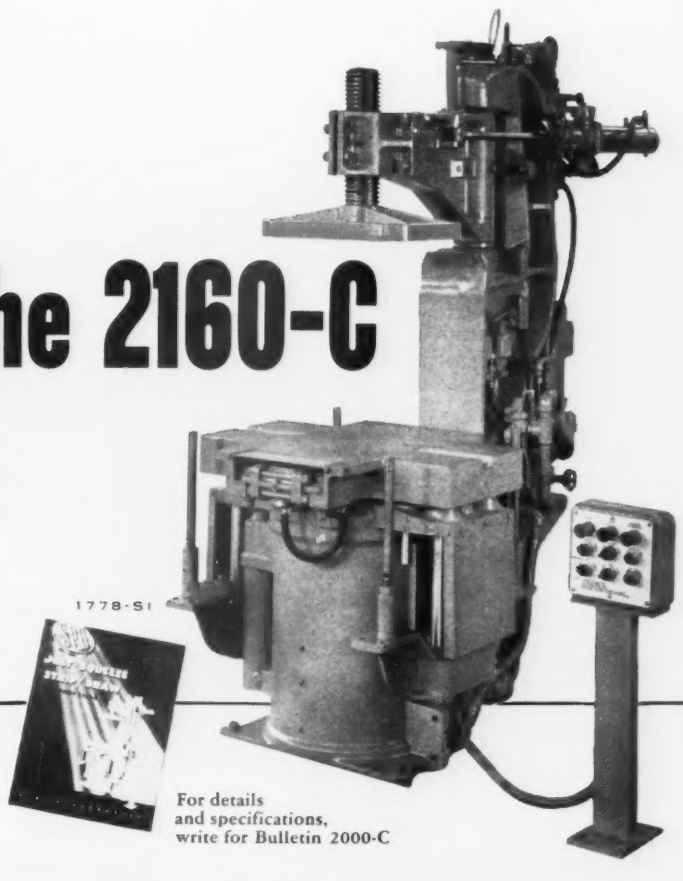

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Middleton in this field is well known here), studies of solidification and feeding, investigation of sands with respect to reclamation and properties, cleaning room practices, alloy segregation in castings, gating, and other aspects of foundry processes. The usual consulting, reporting and abstracting procedures described for the other associations are followed but on a smaller scale, in keeping with the comparatively small size of the present organization.

It is fitting to close this summary of impressions with a record or appreciation to the many individuals and organizations which were visited, for a most generous hospitality accompanied by a spontaneous friendliness which made frank and free discussion possible. The English foundryman may differ from our own in a native reluctance to call one by a first name after a hand-shake, but the spirit of welcome is the same.

Marks 30th Anniversary

Safety Clothing & Equipment Co., Cleveland, celebrated its 30th anniversary on Feb. 11. Designers and manufacturers of safety clothing and equipment for every type of industrial worker, the firm makes protective garments such as aprons, sleeves, mittens, leggings, gloves and other items, including fireproofed materials.

Book Review

Das Giessereiwesen in gemeinfasslicher Darstellung (Comprehensive Treatise on Foundry Technique), 349 pages, 6¾ x 9¾-in., published by Giesserei Verlag, Duesseldorf, Germany. Price 24 D.M.

A joint effort of three German foundrymen's associations and 18 collaborators, this book deals with all phases of foundry practice. It discusses patternmaking, mold and core materials, molders' tools, core and mold making and baking; fuels used, raw materials for iron and steel, copper-base and light metals, melting furnaces, charge calculations, pouring methods, cleaning, heat treatment, properties of castings and methods of test, defects, foundry planning and cost keeping.

The book is a condensed encyclopedia on metal founding, and while experienced foundrymen might wish that various phases had been treated more exhaustively, the book is not written for experts, but for those who wish to become experts. This latter purpose it serves admirably.—*W. Trinks, professor emeritus, Carnegie Institute of Technology.*

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Nominations and supporting papers for the annual Doehler Award of the American Die Casting Institute will be received until Apr. 15, 1954. An individual, group of individuals, educational institution or technical or scientific society or committee thereof is eligible. Nominees need not be engaged in the die casting business or in the employment of a member of the institute.

The award consists of a suitable plaque and a cash honorarium of at least $500. At the discretion of the committee, the award may be more if the income of the fund permits. The award committee consists of the board of directors of the institute and has sole authority over the selection of the recipient and the operation of the award program.

Basis of the award is the annual outstanding contribution to the advancement of the die casting industry or to the art of die casting as represented by technical achievement, advancements in plant operations or other activities. Entries should be addressed to the Award Committee, American Die Casting Institute, 366 Madison Ave., New York 17. Recipient will be chosen by June 30 or as soon thereafter as possible.

Book Review

1954 *Pay Almanac*, by William J. Casey, J. K. Lasser and Walter Lord, plastic, 166 pages, 9 x 11½ in., published by Business Reports Inc., Roslyn, L. I., N. Y. Price $12.50.

Several important circumstances work together to provide the need for a book on intelligent pay planning in 1954, according to the authors. For one thing, although this is the first year since 1949 when the accent is on normal peacetime production rather than on defense production, workers generally will not recognize the fact when they make their pay demands. For another, they say, there will be more workers than jobs, but the scarcity of top talent and experienced men will continue, leaving management to devise ways to attract and to hold key personnel.

This volume contains information about different kinds of compensation now offered by various firms, warns about some of the pitfalls connected with negotiating wages, lists some of the important contracts up for reopening this year and where they will affect wage levels, offers some 50 pages of comparative pay rate and vacation allowance data by industry and by locality and in general advises management how to approach its pay problems in 1954.

VIBRATIONLESS

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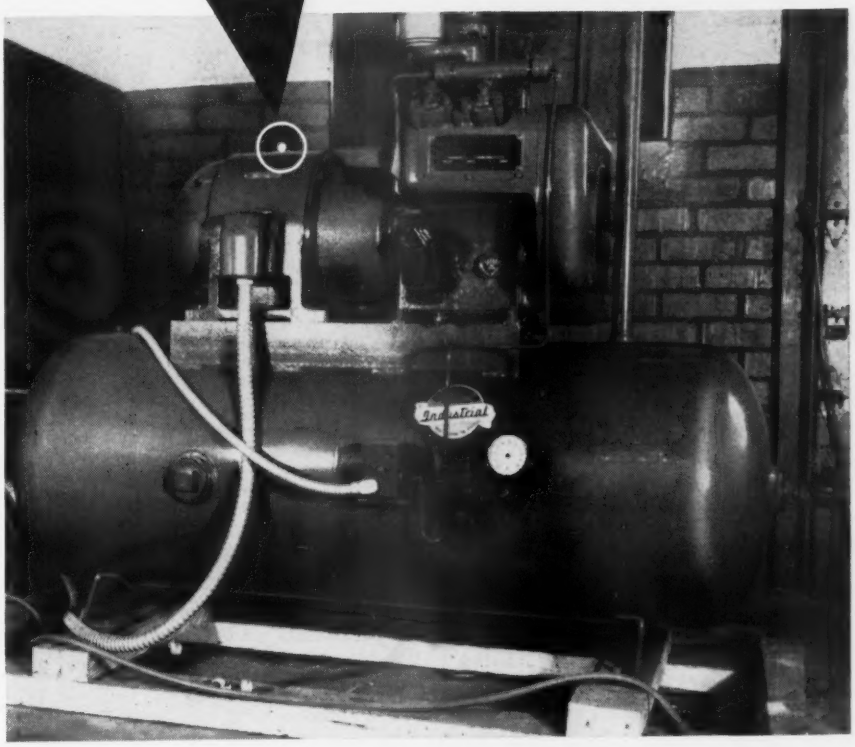

Nickel-balancing on a Schramm Air Compressor was tried—and accomplished—by Homer J. Lockwood, plant superintendent of Bulldog Electric Products, Los Angeles, to prove to himself that Schramm Air Compressors are vibrationless—even when merely on factory skids on which they came!

When this particular Schramm Compressor was uncrated, Lockwood, needing compressed air immediately, started the unit running in a temporary area, on the unit's factory skids. Noticing how smoothly the compressor ran, he got his camera, ". . . set a nickel on edge on top of the motor", took his picture.

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Fig. 1—A variety of cores from different boxes were made with no machine change

CORE BLOWING
in a Steel Foundry

By K. G. MARSHALL
Superintendent of Production
Atlantic Foundry Co.
Akron, O.

EXPERIENCE of Atlantic Foundry Co., Akron, O., in blowing steel foundry core mixes in Federal Foundry Supply Co.'s San-Blo machines has shown that in almost every case in which a coremaking job is taken off the bench and put on the blower, the same number or more pieces can be blown in 1 to 1½ hr than previously were hand-rammed in 8 hr. The blown core's average green hardness is 40 to 45 with dry hardness of 86. Green hardness on hand-rammed cores averaged 60 to 65 with 75 dry hardness.

The hand-rammed core is denser than the other, due to concentration of the bonds and fines within the core body. Bonds and fines in the blown core are concentrated on the surface, creating a hard surface and softer, more open core body.

Originally, Atlantic used wooden or aluminum coreboxes just as they were used on the bench with no additional work put in them before blowing. Shortly thereafter, however, wooden boxes were altered for the blowers. Strips of steel about 3/32 or 1/16-in. thick were placed on the area engaging the vent plate to obtain a good seal between box and plate. To reduce wear from sand abrasion, a piece of shim stock was tacked in the box beneath the blowhole. Heavy screws or bolts were used to reinforce square and rectangular boxes; steel banding was used for circular boxes.

When boxes were replaced or new boxes received, aluminum equipment

(*Continued on page* 306)

Fig. 2—Pin core and its single blowhole box

Fig. 3—Runner cups are blown with four blowholes

Check the advantages of melting and remelting quality steel with TOCCO Induction Heating

Several TOCCO melting furnaces may be operated from one TOCCO high-frequency power source.

Some Users of TOCCO High-Frequency Melting Furnaces

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Watervliet Arsenal
Arwood Precision Casting Co.
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- ✓ High Reproducibility of Results
- ✓ No Carbon Pick-up
- ✓ No Contamination when Composition of Charges is Changed
- ✓ Minimum Space Requirements
- ✓ No Special Installation Charge
- ✓ Simple, Safe Operation
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CLEVELAND 1, OHIO

TOCCO*

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Hardening • Brazing
Annealing • Soldering
Forging • Melting

(*Continued from page* 304)

was specified for long-run jobs or often-repeated work. Splendid co-operation was obtained from most customers in this endeavor. Customers seemed to realize, after understanding the facts, that greater production and a better product is as much to their advantage as it is to the foundry's.

Venting of coreboxes varies with each foundry. Over-venting caused trouble during Atlantic's early blower experience. A soft, open core was produced, resulting in much core breakage and a generally poor quality core. Current procedure is to use ½-in. screen or slotted vents. Both are good, but it is the company's opinion that screen vents release more air faster than slotted vents. No attempt is made to predetermine venting. New boxes are blown with no vents; the core is drawn and examined for soft spots or areas that did not fill out, and it is in these spots that vents are placed.

Machine setups are supervised by a group leader in charge of all coreblowers. It is his job to see that operators have plates, sand, and all equipment necessary on hand to blow cores efficiently. A set procedure in setting up coreboxes is followed. First, the sand chamber is raised out of the way. Then the box is placed in position under the blowhole at an angle which will deliver best blowing results. The guides or stops at the back of the machine are adjusted to hold this blowing position each time the box is placed in the machine. The sand chamber, to which the vent plate is attached, then is lowered to about ⅛-in. above the corebox—just enough for the operator to move the box in and out conveniently.

If the box is rigged and vented properly, the blower will complete a core in 4.2 seconds. The machine is so timed that when the control valve is actuated, the table raises and closes the gap between corebox and vent plate. When this contact is made, the aerator fluffs up the sand, and air at full line pressure is introduced to blow the moving sand into the corebox. Pressure in the box depends upon line pressure and the number of vents, but usually will fluctuate between 35 and 50 psi at 80 psi line pressure.

Because Atlantic is a jobbing foundry operation there are frequent corebox changes, and one of the seven blowers is kept open part of the time to receive the next box to be put in production. The first operator finished with his job goes to the open machine, presses the control valve and blows cores. The group leader sets up the machine the operator just left so that it is ready for the next operator. Although both Federal and Redford Iron & Equipment Co. machines are used, no man is assigned any particular machine. Each man may operate four or five machines in a day's time. The company believes that this production procedure provides the desired flexibility which has helped the coreroom to handle any sudden surge of work on one 8-hr shift.

Maintenance on the machines has been at a minimum. Spare parts are kept on hand in the coreroom and

INGREDIENTS AND PROPERTIES OF SAND MIXES FOR BLOWN CORES

Oil Sand Mix		Oilless Sand Mix
300 lb	Geauga sand	300 lb
3 gal	Silica	4 gal
1 gal	Cereal binder	1 gal
3 qt	Oil	none
none	Bentonite	1 gal
1½ pt	Conditioning oil	none
none	Oilless core binder	6 qt
5 per cent	Moisture	6 per cent
2.4 lb	Green comp. str.	4.5 lb
205	Baked tensile str.	85
70	Green permeability	70
105	Baked permeability	100

Pouring a 6800 pound, 24" round beryllium copper billet which will be scalped, then forged into welding wheels 46" to 56" in diameter and 1" to 4" thick.

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Dept. 20 • 2035 Hamilton Ave., Cleveland 14, Ohio

rarely is the maintenance department called for help to keep the machines operating. The major maintenance cost was a complete overhaul made on the first San-Blo purchased. This machine's work record for a two-year period was 6732 hr based on an 8-hr day, 5½-day week for the first year and a 16-hr day, 5½-day week for the second year.

Coreblowing operations at Atlantic are based on measured performance. An operator is required to produce a given quantity of cores daily to qualify for the top pay rate. The allowed time for each element is set in advance of the actual blowing operation. These allowed times are determined by time and motion study and are compiled into standard data, each job carrying its own card into the coreroom. These elements and the allowed time for each are shown and totaled for the operator, along with the quantity per hour required. The following production figures are a comparison of bench hand-rammed cores on a day work basis with the same core blown on the San-Blo on a measured performance basis.

Left to right in Fig. 4 are a chain sprocket, a housing and a shoe core. Average output per hour in the hand-rammed sprocket was 12 cores per hour. This core now is blown at the rate of 60 cores per hour, the allowed time being 1 minute. This is from the time the box is picked up until the finished core is placed on the roller conveyor. On this job, production has increased 500 per cent.

Production of the housing core averaged five cores per hour. By having the rod and one wire bent on a jig and the rod welded, this core now is blown with one blowhole, at the rate

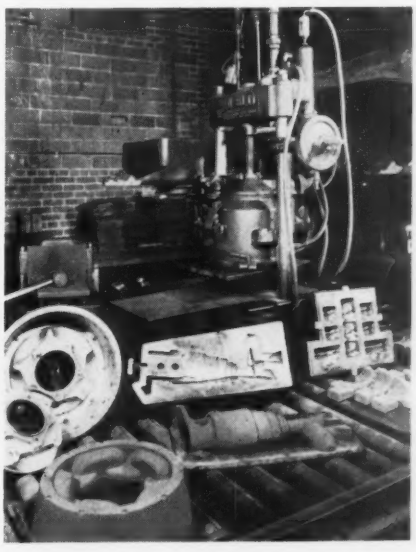

Fig. 4—Left to right are boxes and samples of a sprocket core, housing core and the shoe core

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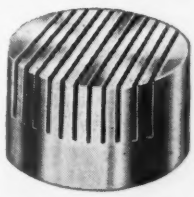
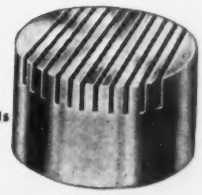
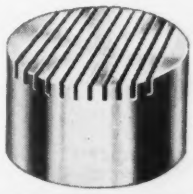


X-TRA DEEP HEAD
.156
Wide Slots
.014

DEEP HEAD
.093
Wide or Narrow Slots
.014 .010





SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

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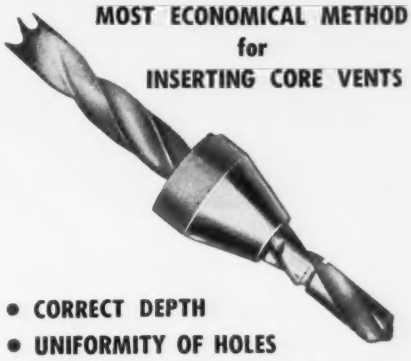

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of 50 cores per hour. This box has one vent under the vent wire. Hand-ramming of the shoe core produced an overage of eight cores per hour. Now with one blowhole and no vents, 50 cores or better are blown per hour.

In the case of the pin core, Fig. 2, average production by hand-ramming was ten cores per hour. This box now is blown with one blowhole and with one vent in each side, the allowed time being 1 minute. Timing begins when the box is picked up and ends when the core is set on the conveyor. The core is blown through the large end; box is reversed and a wire placed into the core from the small end; the core is drawn and set out.

Fig. 3 shows the method of blowing runner cups. The cup box is mounted on the plate and blown with four blowholes on the draw type machine. The runner cup actually is stripped from the box. Two runner cups are blown to a plate and the time calls for slightly under 180 cups per hour.

Must Consider Short Runs

As more jobs were converted from hand to machine it become apparent that short runs from one to ten pieces on an order had not been considered. The expense of overhauling coreboxes and the setup time involved could not be justified for three or four cores on a job that might not be repeated for three or four months. Such work could be produced best no setup time, that would take three or four like boxes without changing, a machine that would require little work on the corebox and blow good cores with little or no venting—a machine that would permit blowing ones, twos, and threes just as fast as a box with 100 pieces mounted on it could be blown.

To meet that problem Atlantic tried Federal's pulsator core blower. Fundamental difference between this and a conventional model is the pressure relief which coreboxes receive. When the control valve is opened, air under full line pressure enters the sand chamber, the aerator fluffs up the sand and the sand then is blown into the corebox, but only until about 10 psi of air pressure is built up in the box. When pressure exceeds 10 lb the pulsator valve shuts off the air. As air escapes through the corebox, the pulsator valve again allows air at full pressure to enter the box until pressure again is built up. Thus the box is filled by spurts of sand. Coreboxes have been taken directly from the bench and produced on the pulsator with no additional reinforce-

ment, and only a few of them were vented. Fig. 1 shows typical cores blown on this machine, one after the other with no machine change.

Speed of blowing is slightly slower on the pulsator than on the conventional model. From 0.10 to 0.13 minute actual blowing time is required. The setup time saved, however, more than offsets the slightly longer blowing time. At Atlantic the pulsator sometimes is operated by one man, but it is preferred to group the boxes so that one man can draw cores while a second is blowing them. Time studies have proved that a series of three boxes is ideal, one being drawn, another being blown, while the third one is being returned. There is practically no idle machine time when using this production procedure.

Production quantity naturally will vary with the corebox or coreboxes if one or more are grouped. The total allowed man minutes for the cores in Fig. 1, from left to right, are: Core No. 1, 0.05 minute; core No. 2, 1.08 minutes; core No. 3, 1.20 minutes; core No. 4 0.10 minute; core No. 5, 0.75 minute, and core No. 6, 1.25 minutes.

Editor's Note: This article is based on material originally presented by the author at the Technical and Operating Conference of Steel Founders' Society of America, 1952.

What Makes a Plant Safe?

(*Continued from page* 121)

reduce the probability of inadvertently closed sprinkler valves which each year are the reason why multi-million dollar losses occur in fully sprinklered plants.

Your exit requirements in every plant building should be carefully evaluated against the Building Exits code issued by the National Fire Protection Association and brought up to regulations if they disagree. In no case should employees have to travel more than 150 feet to a safe exit.

Because emergencies occur infrequently, the only way to be sure that people will respond correctly is through proper training. This applies not only to fire squads, watchmen and fire brigades, but to the evacuation of buildings without confusion. Assurance of proper reactions will depend on how well your personnel has been rehearsed before the fire occurs.

Top Management Support—In the final analysis, responsibility for a safe plant rests squarely with management. It isn't enough simply to authorize the spending of money. It is up to management to see that interest in safety and fire protection pervades the entire organization

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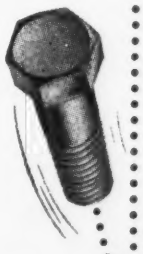

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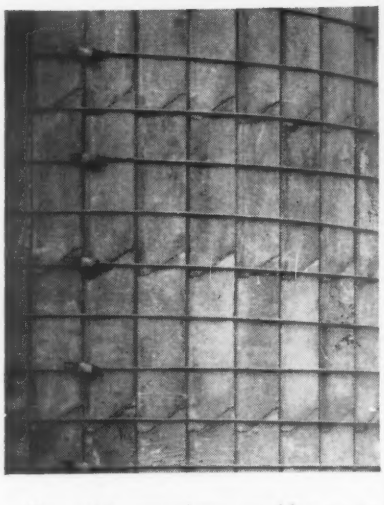

In the photograph you see how the diagonal-ended staves of a Neff & Fry Storage Bin are laid up. They are grooved and beaded to lock together. Each course is encircled with as many galvanized steel rods as needed to withstand the thrust of the load.

Our bins (often termed silos or tanks) are used by scores of America's leading companies for handling more than 80 kinds of flowable bulk materials; notably, cement, coal, clay, grain, gravel, ore, sand, wood chips.

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Despite the thin walls, the structures have sufficient load-bearing ability to carry heavy superstructures without additional supports.

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down through the supervisory personnel to the employees themselves.

Responsibility for planning and coordinating prevention and protection must be definitely assigned to one or several individuals as plant size and organization require. Men given this responsibility must be able to make subordinates realize that accident and fire prevention are part of their job of maintaining production without interruption.

Too often a requirement for fire safety will be disregarded because of objections of those responsible for manufacturing. There need be no conflict between manufacturing and safety requirements and this is particularly true if your fire and casualty underwriters are given the opportunity of working with you in planning new facilities. Most of the difficulties arise in trying to apply safety measures to existing facilities.

To sum up, here are your five simple fundamentals:

Use safe construction.

Install complete automatic sprinkler system.

Provide ample water supply.

Organize, educate and drill employees in fire prevention and protection.

Induce management to take active part in making entire organization fire-safety-conscious.

By carefully observing these rules you will restrict any fire to a small area, protect the lives of employees and prevent extensive interruption of production.

As one large company expresses it, "Profitable production is the goal of every plant. The attainment of that end rests largely on the effective integration of men, materials and equipment for one common purpose. Interruption of the functioning of any of these three elements tends to impair the flow of production.

Practically every accident or fire hinders to some degree the performance of these three parts of production. In other words, safety is coincident with efficient, profitable production."

AMA Issues Booklet

Latest addition to the Personnel Series of booklets issued by the American Management Association is No. 153, *The Personnel Administrator at the Crossroads: Meeting the New Challenges of Personnel Management.*

It contains four individual papers and a panel discussion on the dynamics of present day labor relations. Copies are available for $1.25 each from the association, 330 West 42nd St., New York 18.

Alloy Gray Iron

(*Continued from page* 123)

ing. The other 100 pounds will go into gates, sprues, risers, etc.

2. Because it is difficult to estimate the exact weight of metal needed to pour a certain number of alloy castings, it is common practice to provide a little more metal than it is estimated will be required. Assuming that this allowance is 10 per cent, 220 pounds of alloy metal would have to be provided for each 100 pounds of alloy castings. This extra 20 pounds will go into "over-iron" which will be pigged.

3. It is also necessary to provide for losses from spills, ladle skulls, etc. If this loss is estimated to be 5 per cent, 230 pounds of alloy metal would be required to pour 100 pounds of castings. This extra 10 pounds is lost and cannot be recovered.

4. In order to have 1 per cent alloy content in the casting, it is necessary to have 1 per cent alloy content in the entire 230 pounds of melted metal required to pour it. One must therefore add 1 per cent of 230 pounds, or 2.3 pounds of alloy X in the ladle to pour 100 pounds of castings.

5. There will, however, be some loss of alloy content in the ladle from oxidation losses in slag—skimming, etc. If this loss is estimated to be 5 per cent, one would have to add another 5 per cent of 2.3 pounds, or .12 pounds, making a total of 2.42 pounds of alloy to be added in the ladle.

6. The cost of 2.42 pounds of alloy X at $1 per pound of "alloy content" would be $2.42.

7. However, some allowance must also be made for loss from defective castings. If this loss is estimated to be 10 per cent, the above figure would have to be increased by 10 per cent or $.24, making a total cost of $2.66 per 100 pounds of good castings produced.

To sum up these calculations, the special Additional Cost to be used for this particular metal in pouring a 100-pound casting would be arrived at as follows:

Pounds of Melted Metal Required—	
To allow for 50% yield	200 lb
To allow for 10% over-iron	20 lb
To allow for 5% losses from spills, ladle skulls, etc	10 lb
Total	230 lb
Pounds of Alloy Content Required—	
For alloy content of 1%	2.30 lb
Allowance for 5% "ladle loss"	.12 lb
Total	2.42 lb
Cost at $1 per lb of "contained alloy"	$2.42
Allowance to cover 10% loss	

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*Patent No. 2,445,038. Other patents pending.

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Material Handling Equipment

RUSH CATALOG 83

FOR YOUR CONVENIENCE

*YOUR NAME*_____

*COMPANY NAME*_____

*ADDRESS*_____

*CITY*_____ *STATE*_____

from defective castings	.24
Total per 100 lb good castings	$2.66

This Additional Cost should be added to the regular Base Metal Rate used for castings made from the regular base metal. Since the Base Metal Rate in this foundry is assumed to be $4.50 per 100 pounds, the Special Metal Rate for Cost of Melted Metal for this particular metal would be $7.16 per 100 pounds of good castings produced. Note: The percentage figures used in the above example for various losses and allowances are purely hypothetical. In calculating the Special Metal Rate for any particular metal, each foundry should make its own estimate of the percentages to be used for the various losses and allowances involved. The losses may be substantially higher on some alloys than on others.

Adding Alloys in the Cupola—This procedure is exactly the same as the procedure described above for ladle additions, except that the loss of alloy content in the cupola melting process might be greater than in making ladle additions. This loss is frequently as much as 10 or 15 per cent. Each foundry should make its own estimate of this loss based on its own experience with the particular alloy used.

Allowance for Alloy Recovery—Unless alloy castings are produced in substantial volume in separate melting furnaces, recovery of the alloy content in the recycle scrap is usually impracticable for the following reasons:

I. It is very difficult and often impracticable to segregate the alloy returns from the returns from the regular base metal. This is particularly difficult:

1. When the total weight of alloy castings poured is only a small proportion of the total melt.
2. When several different alloy metals are produced on the same day.
3. When one or more of the alloy metals are produced only occasionally.

II. When the segregated alloy returns are added to a special charge in the regular cupola, some of the alloy content is likely to get into the preceding or succeeding charge so that the full content does not get into the special charge.

For the above reasons, it is not safe practice to make any allowance for recovery in the case of ladle additions, especially since these usually involve comparatively small percentages of alloy content.

When alloys are added to a special charge in the cupola it is also usually impracticable to count on any recovery of the alloy content in alloy returns unless the alloy content is very substantial, usually over 4 per cent.

Where alloy castings are produced in substantial volume in separate furnaces, recovery of the alloy content in the alloy returns may be practicable and the procedure for calculating the allowance for recovery is as follows:

Referring to the example used earlier, the total amount of alloy metal recovered per 100 pounds of good castings produced would be:

Gates, sprues, risers, etc.	100 lb
Over-iron at 10% of 200 lb	20 lb
Bad castings at 10% of 100 lb	10 lb
Total	130 lb

The amount of alloy in 130 pounds of returns containing 1 per cent of alloy X would be 1.3 pounds and its value at $1 per pound would be $1.30. However, allowance must be made for a probable oxidation loss in remelting of approximately 10 per cent. Therefore the value recovered would be only $1.30 less 10 per cent or $1.17.

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5252 Broadway, Chicago, Ill. Phone: Uptown-8-1322

Additional Rate of $2.66 calculated above, the net cost would be $2.66 less $1.17 or $1.49 per 100 pounds of good castings produced. The Special Metal Rate for this metal, allowing for full recovery, would therefore be $5.99.

The above Special Metal Rate of $5.99 for this metal is based on maximum possible recovery under ideal conditions—separate melting equipment and perfect segregation of the alloy returns. Unless the foundry has found from experience that such full recovery can be attained, a liberal factor of safety should be added.

Production in a Separate Furnace—When alloy metals are produced in one or more special furnaces—electric furnace, air furnace, or special cupola—it is usually advisable to set up a separate cost division for the separate furnace or furnaces, and to carry a complete set of cost accounts for this cost division similar to those carried in the regular melting department (see pages 8 and 31 of Cost Manual No. 1). The Cost of Melted Metal for any special alloy metal can then be determined in several ways depending on the method of production:

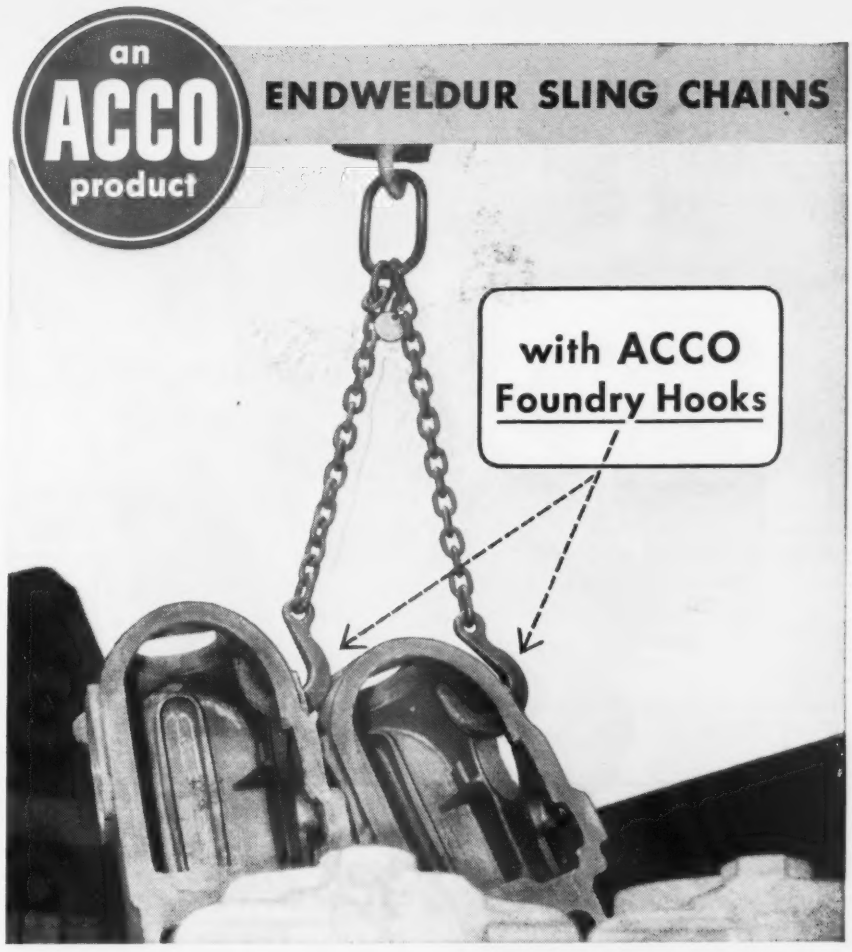
I. When only one specific alloy metal is melted in the special furnace, the procedure described in Cost Manual No. 1 (Basic Method) or in the preceding part of this section (Yield Method) may be used.

II. When several different alloy metals are produced by running special heats in the special furnace, it may be possible to determine by standard procedure a melting cost which will be approximately correct for all types of metal and to determine a metal cost for each type of metal by calculating the total cost of the charge and dividing this by the total good castings produced from this charge, taking account of yield, various losses, etc.

III. When several different alloy metals are produced by melting a special base metal in the special furnace and adding alloys in the ladle, the estimating rate for cost of melted metal for this special base metal may be calculated by standard procedure, and the special additional rate for each special mixture may be calculated by the procedure described in this chapter.

IV. When melted metal (base mixture) is transferred from the regular cupola to the special furnace (duplexing) and alloys are added in the special furnace, the special rate for any special alloy metal will be the sum of the following items:

1. Base Metal Rate for regular base mixture.



How You Can Speed Up Handling of Castings

• Castings frequently are odd shaped and hard to hitch to with regular sling hooks. So AMERICAN developed the series 500 ACCO Foundry Hook with rounded point and wide mouth that can be hooked to a wide variety of lifts.

These hooks are drop forged of the same material as the chain. They are built into ACCO *Registered* Endweldur Sling Chains at the factory and the complete assembly is proof-tested from bearing to bearing.

ACCO Foundry Hooks are safer than home-made hooks. And they're cheaper because you save the cost of fabricating and assembling to the chain in your plant. The completed unit bears the well-known ACCO *Registered* identification ring—your assurance of highest sling chain quality.

See your AMERICAN CHAIN distributor or write our York, Pa., office for DH-130

ACCO

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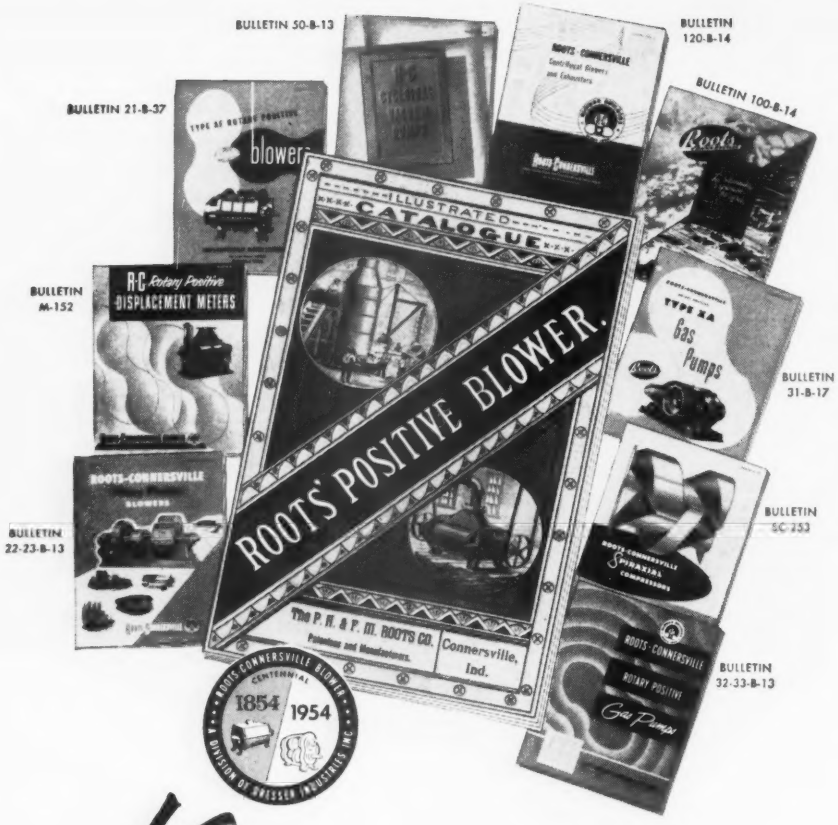
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

American Chain



Keeping pace with industry for 100 years

This early "Roots" catalog, published in 1879, offered only Rotary Positive Blowers. That was our exclusive business at that time—25 years after the invention of the rotary positive principle by Francis M. Roots.

Today, because of the greatly increased use of gas and air for industrial purposes, it takes a great many bulletins and booklets to describe our expanded line of products. As new ideas, new developments are utilized in industrial processing, Roots-Connersville keeps pace with new equipment to handle gas and air most effectively and economically. And that is still our only business.

Into these bulletins, any of which are yours for the asking, are condensed our 100 years of experience in building such equipment, from the first Rotary Positive Blower in 1854 to our latest 1953 development, the Spiraxial Compressor. They describe R-C products which are up to date in design and construction, to match specific needs of industry.

We suggest that when your business has a job of handling gas or air, you consult the exclusive specialist for 100 years.

Reg. U. S. Pat. Off.

BLOWER BUILDERS SINCE 1854

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.
354 Madison Ave. • Connersville, Indiana

2. An additional rate representing the cost of passing this hot metal through the special furnace, determined by standard procedure from the costs of the special cost division setup for this furnace.

3 An additional rate to cover the cost of the alloys added, determined by the procedure described in this chapter, which takes into account the various losses encountered.

General Suggestions—All foundries that regularly produce alloy castings should calculate, by the procedure described in this section, a special estimating rate for cost of melted metal for each type of alloy produced and should then prepare a table listing all these estimating rates by alloy, and by the various percentages of the alloy, which are regularly produced.

The regular production of alloy castings requires special knowledge, special technique, and often special equipment. Special risks are involved which may cause additional costs that cannot be taken into account by any theoretical cost procedure. Therefore, determination of the *true* cost involves far more than a simple mathematical calculation of the cost of the alloys used.

Air Pollution Group Will Meet in Chattanooga

Plans are well under way for the annual meeting of the Air Pollution Control Association, to be held May 3, 4 and 5, at Hotel Patten, Chattanooga, Tenn. May 6 can be used for sightseeing and social activities by those persons who can be present for four days. In the past such activities were sandwiched between technical presentations, making the meetings four-day affairs.

Chairman of APCA's annual meeting program committee is W. C. L. Hemeon, director of engineering of the Industrial Hygiene Foundation. He and his committee are selecting papers for the meeting. Local arrangements are under the direction of Fain W. Ingram, director, air pollution control and boiler inspection, Chattanooga. Chairman and co-chairman respectively of APCA's permanent annual meeting committee are R. M. Landon, assistant to the general manager of the manufacturing department, Gulf Oil Corp., Pittsburgh, and H. P. Hobart, Gulf Oil consultant.

Both of the last two meetings, in Baltimore and Cleveland, drew more than 600 visitors. It is expected that this figure will be exceeded this year.

TRADE PUBLICATIONS

For More Details Use Reply Card—Page 283

RUBBER BELT SPLICES: B. F. Goodrich Co., Akron, O.—Users of rubber transmission belts can learn how to splice them effectively in this 32-page illustrated handbook, which illustrates and describes each step in the procedure and enumerates the necessary tools and materials.
For More Details Circle No. 101—Page 283

NICKEL CHROME CASTINGS: Standard Alloy Co., 1679 Collamer Rd., Cleveland 10—Engineering data bulletin 1 on a nickel-chrome alloy gives complete data on chemical composition; physical, mechanical and heat and corrosion resistant properties; recommended design stresses; heat treatment; machinability and weldability.
For More Details Circle No. 102—Page 283

AIR VALVE: Pantex Mfg. Corp., P. O. Box 660, Pawtucket, R. I.—Wobble-rod air valve is said to offer a new approach to on-off control of pneumatic systems to designers and users of machinery and processing equipment. It's described in detail in bulletin 61861. Photographs and sectional and engineering drawings are included.
For More Details Circle No. 103—Page 283

ALUMINUM ROOFING: Aluminum Co. of America, 804 Alcoa Bldg., Pittsburgh 19—Corrugated aluminum roofing and siding have helped to solve many industrial construction problems. Details about their applications and maintenance-free characteristics are presented in a new booklet.
For More Details Circle No. 104—Page 283

HYDRAULIC PRESSES: R. D. Wood Co., Public Ledger Bldg., Independence Square, Philadelphia 5—Information on representative hydraulic presses and equipment manufactured by the company is available in an illustrated brochure which also contains basic hydraulic press specifications.
For More Details Circle No. 105—Page 283

VANEAXIAL BLOWERS: Hartzell Propeller Fan Co., Piqua, O.—Bulletin A-110 contains a variety of engineering information concerning direct-drive and belt-drive vaneaxial blowers and a special portable blower for exhausting fumes from tanks.
For More Details Circle No. 106—Page 283

ELECTRIC HEAT: Edwin L. Wiegand Co., 7596 Thomas Blvd., Pittsburgh 8—Illustrated case histories in "101 Ways to Apply Electric Heat" show tested ways to apply metal-sheathed electric heating units and infrared heating to industrial jobs.
For More Details Circle No. 107—Page 283

MANGANESE STEEL: American Manganese Steel Division, American Brake Shoe Co., 389 East 14th St., Chicago Heights, Ill.—A complete discussion under each product cate-

We Invite You to try "SUPERFLAKE"* FOUNDRY PRODUCTS

Please check the products which interest you, fill in the coupon and we will be glad to send you samples of our GOOD foundry products.

CHECK HERE

	"MOLDUKO"* CORE & MOLD WASH Produces smooth castings—Stops "burning in"—Airdries Will ship **10 Gals. of Molduko & 25 lbs. of Filler** at full drum prices for test purposes.
	HYDRO GRAPHITE *(It's New!)* Excellent permanent mold wash.
	"CARBON-RAISER"* (Add to the metal in the ladle, at the spout, in the furnace or in the cold charge) **IRON FOUNDRIES** use to control depth of chill and improve the machineability of the castings. **STEEL FOUNDRIES** use to control carbon content, in the ladle and in the furnace quickly, accurately and efficiently.
	PARTING (DRY or LIQUID) Non Silica or Tripoli, Highest Quality
	PIPE REDUCER Used on "Gates" and "Risers" in Steel & Iron foundries.
	PLUMBAGO & CORE WASHES In both Dry and Paste forms.
	LADLE WASH
	MUDDING COMPOUNDS
	CORE PASTES Strong bond, Dry quickly.

* *These trade marks Reg. U.S. Patent Office.*

PLEASE SEND SAMPLES AND INFORMATION ON THE PRODUCTS CHECKED.

Name ..... *Title* .....

Company .....

Address .....

SUPERFLAKE GRAPHITE PRODUCTS

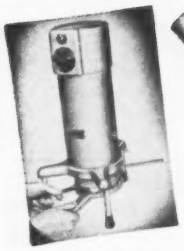
SUPERIOR FLAKE GRAPHITE COMPANY

Manufacturers of mold and core washes, facings, parting compounds, core paste, carbon-raiser.

TELEPHONE: RANDOLPH 6-7939

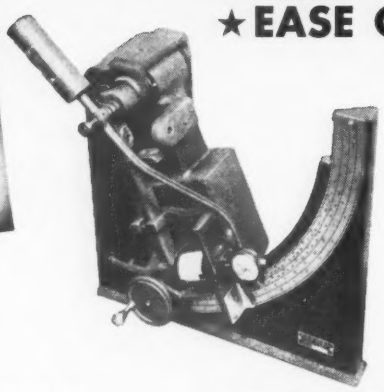
33 So. Clark Street *Chicago (3) Ill.*

QUALITY CASTINGS *at low cost with* SAND CONTROL



MOISTURE

★EASE OF MOLDING



Improves with moisture, green strength, deformation and flowability control.

GREEN STRENGTH AND DEFORMATION

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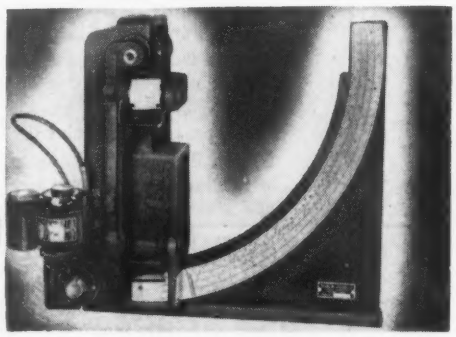
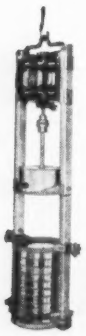
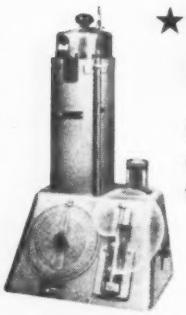
Improves with hardness, air-set and dry strength control.

MOLD HARDNESS

AIR-SET AND DRY STRENGTH ➤



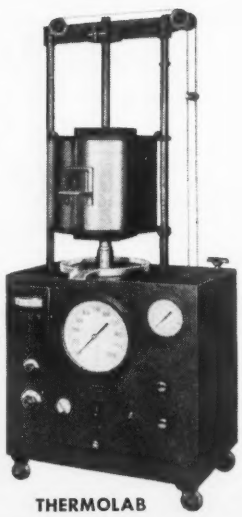




FINENESS PERMEABILITY

★CASTING FINISH

Improves with sand grain size and distribution control.



THERMOLAB

★CASTING QUALITY

Improves with hot strength and hot deformation control, which insures freedom from mold wall and core failure at pouring temperatures.

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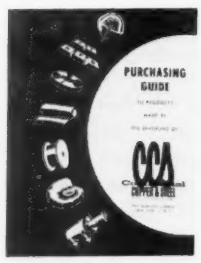
gory of the impact and abrasion resistant characteristics of 13 per cent manganese steel castings appears in a general catalog which also shows over 100 photographs of typical castings.

For More Details Circle No. 108—Page 283

BELT METER: Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44—Belt meter described in instrumentation data sheet 10.18-3 continuously weighs steady flow of loose material on a conveyor belt, records rate of flow and totalizes accumulated tonnage.

For More Details Circle No. 109—Page 283

METAL PRODUCTS: Continental Copper & Steel Industries Inc., 345 Madison Ave., New York 17—To facilitate the purchase of the hundreds of products made by its seven divisions, including Niagara Falls Smelting & Refining Division, the organization now is distributing a detailed purchasing guide listing such classifications as nonferrous alloys, tool steels, pipe and others.



For More Details Circle No. 110—Page 283

THERMOCOUPLES: Foxboro Co., Foxboro, Mass.—Bring your reference material on thermocouples and accessories up to date with the new, 36-page edition of "Thermocouples and Accessories." It lists, with specifications, standard thermocouples for all applicable temperature ranges, plus parts, supplies and accessories.

For More Details Circle No. 111—Page 283

GATES AND VALVES: Stephens-Adamson Mfg. Co., Aurora, Ill.—Get complete data concerning the company's full line of gates and valves in bulletin 1252. Units covered include double closure and air lock valves and bin, slide, quadrant and other types of gates.

For More Details Circle No. 112—Page 283

SHAKEOUTS: Allis-Chalmers Mfg. Co., 1032 South 70th St., Milwaukee—Your foundry may have a shakeout problem that can be solved by one of the units described and illustrated in a catalog of the firm's complete line. Dimensions and technical data are included.

For More Details Circle No. 113—Page 283

PRECIPITATOR: Research Corp., Bound Brook, N. J.—Quick understanding of the design features of an electrostatic precipitator for open-hearth steelmaking applications is available in a bulletin entitled "Open-Hearth Stack Gas Cleaning."

For More Details Circle No. 114—Page 283

CASTING IMPREGNATION—Polyplastex International Inc., 441 Madison Ave., New York 22—Impregnation system to assure density and

(*Continued on page* 319)

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• For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 283.

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1	36	69	100	222-3	260	295	321R	331BL
2	37	70-71	127	225	261	296	321L	332T
4-5	38-39	72	129	226T	263	297R	322L	332BL
6	40	73	131	226B	265	297L	322TR	332R1
7	41	74	133	227	267	298T	322BR	332R2
8-9	42	75	135	228L	268	298B	323R	333R3
10	43	76	137	228R	269	299	323TL	333R
11	44-45	77	139	230	270T	300-1	324T	333TL
12	46	78	143	231	270B	302L	324B	333BL
13	47	79	145	232-3	271	302R	326L	334L1
14	48	80	146	234T	272	303	326TR	334L2
15	49	81	148-9	234B	273	305	326BR	334R1
16	50-51	82	151	235R	275	306	327R	334R2
17	52	83	153	235L	277	307R	327TL	334R3
18	53	84	154	236	278T	307L	327BL	334B
19	54	85	157	239	278B	308T	328T	335T
20-21	55	86	159	240	279	308B	328L1	335BR
22	56	87	161	242	282	309	328L2	335BL
23	57	88	163	243	285	310T	328R2	336L
24	58-59	89	164	245	286-7	310B	328B	336R1
25	60	90	209	247	288	311	329R	336R2
26	61	91	210	251	289R	312	329TL	336R3
27	62	92-93	212	253	289L	313	329BL	336R4
28	63	94	213	254	290T	314	330L	346L
29	64	95	215	256T	290B	315	330R1	350
30	65	96	217	256B	291	316	330R2	IBC
31	66	97	219	257	292	319	330R3	OBC
32	67	98	220	258	293	320L	331T	

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4-5	38-39	72	129	226T	263	297R	322L	332BL
6	40	73	131	226B	265	297L	322TR	332R1
7	41	74	133	227	267	298T	322BR	332R2
8-9	42	75	135	228L	268	298B	323R	333R3
10	43	76	137	228R	269	299	323TL	333R
11	44-45	77	139	230	270T	300-1	324T	333TL
12	46	78	143	231	270B	302L	324B	333BL
13	47	79	145	232-3	271	302R	326L	334L1
14	48	80	146	234T	272	303	326TR	334L2
15	49	81	148-9	234B	273	305	326BR	334R1
16	50-51	82	151	235R	275	306	327R	334R2
17	52	83	153	235L	277	307R	327TL	334R3
18	53	84	154	236	278T	307L	327BL	334B
19	54	85	157	239	278B	308T	328T	335T
20-21	55	86	159	240	279	308B	328L1	335BR
22	56	87	161	242	282	309	328L2	335BL
23	57	88	163	243	285	310T	328R2	336L
24	58-59	89	164	245	286-7	310B	328B	336R1
25	60	90	209	247	288	311	329R	336R2
26	61	91	210	251	289R	312	329TL	336R3
27	62	92-93	212	253	289L	313	329BL	336R4
28	63	94	213	254	290T	314	330L	346L
29	64	95	215	256T	290B	315	330R1	350
30	65	96	217	256B	291	316	330R2	IBC
31	66	97	219	257	292	319	330R3	OBC
32	67	98	220	258	293	320L	331T	

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FOUNDRY Readers Service

(*Continued from page* 316)

to increase pressure tightness of castings is not a salvage method for inferior or defective units, according to a booklet which contains two pages of case histories showing successful applications of impregnated castings.
For More Details Circle No. 115—Page 283

PRECISION INSTRUMENTS: Chicago Dial Indicator Co., Dept. 41, 180 North Wacker Drive, Chicago—Read about a line of precision instruments that includes dial indicators, various types of test sets, bench gages, depth gages and many others in general catalog 106.
For More Details Circle No. 116—Page 283

FOUNDRY PRODUCTS: R. Lavin & Sons Inc., 3426 South Kedzie Ave., Chicago 23—Both nonferrous and ferrous foundrymen will be interested in a brochure on deoxidizers, degasifiers, fluxes and phosphor copper, pure copper and nickel-copper ladle additions for alloying purposes.
For More Details Circle No. 117—Page 283

HEAT TREATING: Metal Treating Institute, 271 North Ave., New Rochelle, N. Y.—Send for this folder for information as to what to specify on purchase orders when buying heat treat service. The folder also contains a glossary of terms used in heat treating.
For More Details Circle No. 118—Page 283

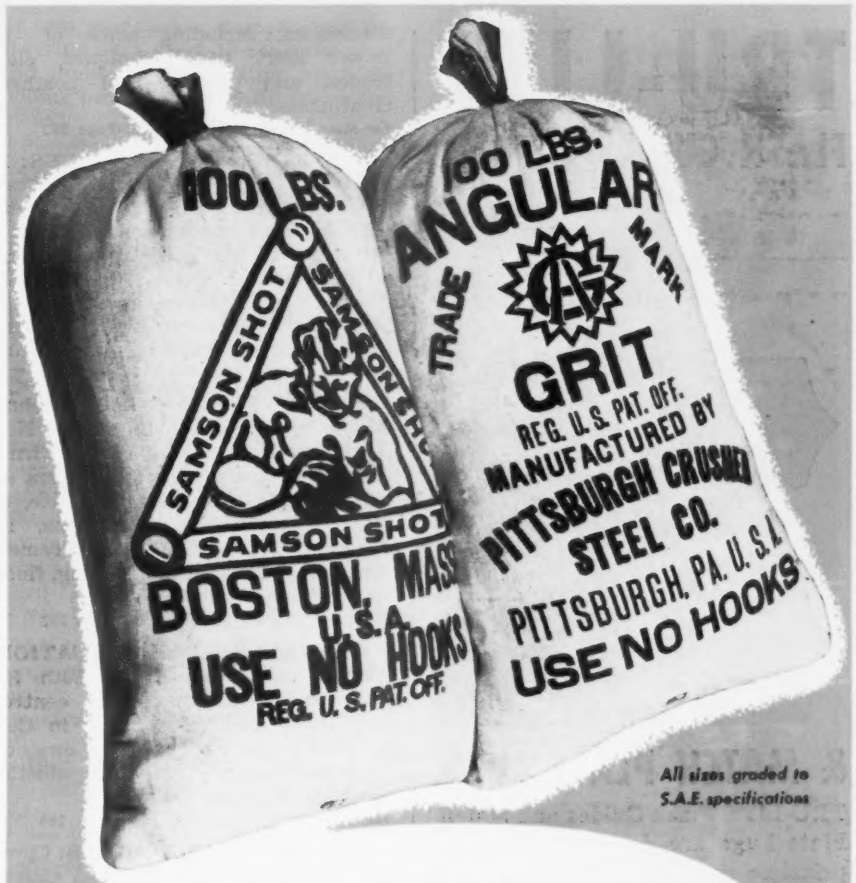
SPUR GEAR HOIST: Coffing Hoist Co., Danville, Ill.—Hoist features, dimension drawings and specifications for ½, 1 and 2-ton models of a lightweight spur gear hoist are contained in bulletin CH. A cutaway drawing indicates how the hoist is designed and serviced.
For More Details Circle No. 119—Page 283

EXCAVATOR: Koehring Co. Sales Office, 3026 West Concordia Ave., Milwaukee 16—Concise textual matter and 25 photographs and diagrams tell the story of a 15-ton, ½-cu-ft dipper capacity excavator which can be equipped as a shovel, a hoe, a crane or a dragline. Performance, operating characteristics and engineering data are covered.

For More Details Circle No. 120—Page 283

FUME WASHER: U. S. Stoneware Co., Process Equipment Division, Akron 9, O.—Portable fume washer for low cost fume removal is the subject of bulletin FW-3. Complete technical data, drawings, performance charts and dimensional information are included.
For More Details Circle No. 121—Page 283

NICKEL ALLOY STEELS: International Nickel Co., 67 Wall St., New York 5—Bulletin A-93 presents information, tables, graphs and illustrations on the welding of nickel alloy steels. It studies varied welding



All sizes graded to S.A.E. specifications

"Certified" Abrasives
clean more castings per dollar!

"Certified" Samson Shot and Angular Grit are made *extra-tough* by a special *automatically controlled* hardening process. They wear longer, can be used over and over again . . . actually clean more castings per dollar! Save money . . . switch to "Certified" Abrasives.

Experienced Foundrymen say:

Always specify "Certified"

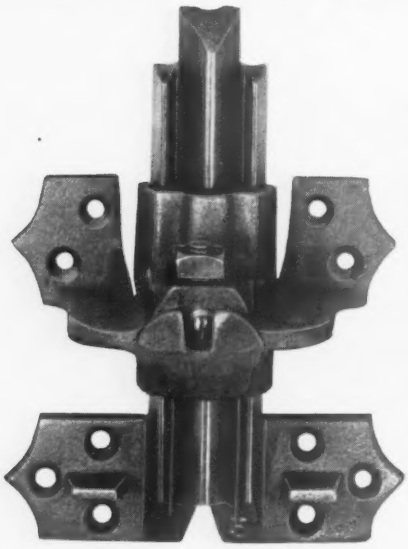
ACCEPTED AND USED FOR OVER 55 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

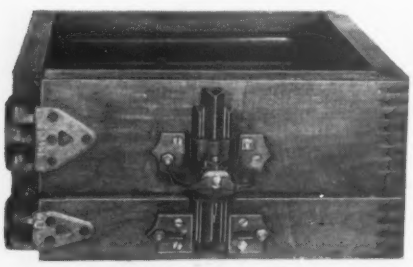
MEMBER FEMA

TRU-LIFT
FLASK GUIDES & PINS



& MATCH PLATE LUGS

TRU-LIFT Flask Guides and Match Plate Lugs are designed around a principle used by many production foundries for more than 30 years. This feature comprises a multiple of 3 V-Shaped projections on the pin surface, and 3 V-Shaped grooves on the sliding surfaces of the cope guides. Thus, with the use of TRU-LIFT you get a *straight vertical lifting of the cope,* and removal of the Match Plate, similarly. TRU-LIFT guides are simple to install . . . let us send you a trial set for your examination and use.



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techniques, including some of the newer inert gas techniques, electrodes, and preheat and postheat treatments.
For More Details Circle No. 122—Page 283

INSTRUMENTS AND GAGES: F. W. Dwyer Mfg. Co., 317 South Western Ave., Chicago 12—Condensed bulletin explains characteristics and applications of a line of specialized instruments and gages that includes devices for measurement of combustion, draft, pressure, flow, vacuum, CO_2, smoke, velocity and temperature.
For More Details Circle No. 123—Page 283

BUILDING MATERIALS: Johns-Manville, 22 East 40th St., New York 16—New edition of the firm's industrial products catalog offers essential data, brought up to date, on such materials as insulations, refractory products, asbestos cement pipe, packings, gaskets, roofing, flooring and many more.
For More Details Circle No. 124—Page 283

CENTRALIZED LUBRICATION: Farval Corp., 3249 East 80th St., Cleveland 4—Discussion of centralized lubrication in "Studies in Centralized Lubrication, 1953" shows how such systems can increase production and lower costs.
For More Details Circle No. 125—Page 283

DIE CASTING MACHINES: Cleveland Automatic Machine Co., Cincinnati 12—Folder on universal high-pressure hydraulic die casting machines presents information on construction, performance and general specifications of two models.
For More Details Circle No. 126—Page 283

SHELL MOLDING: Shalco Engineering Corp., Palo Alto, Calif., and Shallway Corp., Connellsville, Pa.—A discussion of deep draws and the facility with which they can be made when the shell molding process is used features bulletin 302.
For More Details Circle No. 127—Page 283

FLEXIBLE SHAFT TOOLS: Wyzenbeek & Staff Inc., 223 North California Ave., Chicago 12—The company's line of flexible shafts, flexible shaft machines, saw attachments, hole cutters and related items is covered in catalog 54.
For More Details Circle No. 128—Page 283

OPTICAL PYROMETER: Pyrometer Instrument Co., Bergenfield, N. J.—Both detailed information on an optical pyrometer and technical information on the principles of optical pyrometry are available in catalog 85.
For More Details Circle No. 129—Page 283

SEACOAL: Penn-Rillton Co., 324 West 23rd St., New York 11—Folder describes a dustless seacoal from which fines have been removed mechanically, without change in particle size or distribution.
For More Details Circle No. 130—Page 283

WELDING ELECTRODES: Wall Colmonoy Corp., 19345 John R St., Detroit 3—Austenitic nickel-manganese steel bare and coated welding electrodes produce a weld deposit with the general characteristics of 12

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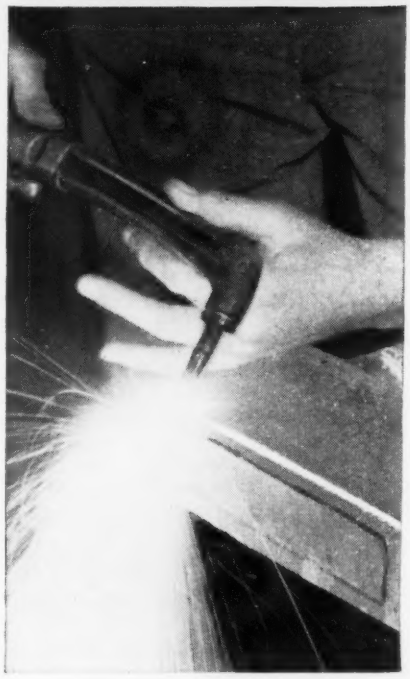

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For More Details Circle No. 131—Page 283

NONFERROUS ALLOYS: Shenango-Penn Mold Co., Dover, O.—Write on your letterhead for a comprehensive specification bulletin which contains a detailed alloy chart showing comparative specifications, chemical analyses and minimum physical properties of the company's nonferrous alloys.
For More Details Circle No. 132—Page 283

SILICON CARBIDE: Public Relations Dept., Carborundum Co., Niagara Falls, N. Y.—A discussion of the properties of silicon carbide as related to its various applications and an outline of manufacturing techniques are included in a brochure called "Facts About Silicon Carbide."
For More Details Circle No. 133—Page 283

MELTING FURNACES: Reda Pump Co., Furnace Division, Bartlesville, Okla.—Fuel consumptions, refractory performances and typical daily melt records of reverberatory melting furnaces accompany general information about the units in a folder.
For More Details Circle No. 134—Page 283

AUTOMATIC FILTERS: Dollinger Corp., 11 Centre Park, Rochester 3, N. Y.—Specifications and engineering and performance data covering automatic filters in a wide range of sizes for handling any air capacity desired are offered in bulletin 500.
For More Details Circle No. 135—Page 283

PNEUMATIC SAND CONVEYING: Crane Co., 836 South Michigan Ave., Chicago 5—Pneumatic pipeline conveying system transports sand or other bulk materials to as many as 14 different locations. Form AD-1906 tells the story.
For More Details Circle No. 136—Page 283

RUBBER BELTING: Hamilton Rubber Mfg. Co., Trenton 3, N. J.—"Belting for Industry" is a handy reference guide on belting constructions that lists various types of rubber conveyor belting and their uses.
For More Details Circle No. 137—Page 283

CASTABLE REFRACTORIES: Ironton Fire Brick Co., Ironton, O.—Bulletin 104 is devoted to castable refractory concretes which can be cast in any shape required and which are for service from 0 to 3000°F.
For More Details Circle No. 138—Page 283

LIFT TRUCK: Hyster Co., 2902 Northeast Clackamas St., Portland 8, Oreg.—A 4000-lb capacity, all-purpose, inside-outside lift truck is described completely, with specifications and on-the-job photos, in form 1284.
For More Details Circle No. 139—Page 283

POWER SCOOP: Jeffrey Mfg. Co., Columbus 16, O.—One man can unload bulk material from boxcars with an automatic power scoop described in bulletin 863.
For More Details Circle No. 140—Page 283

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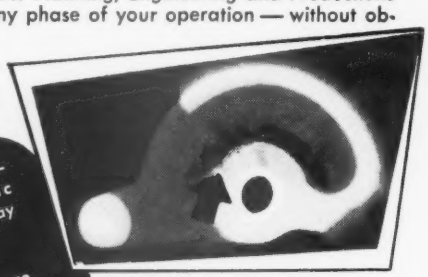

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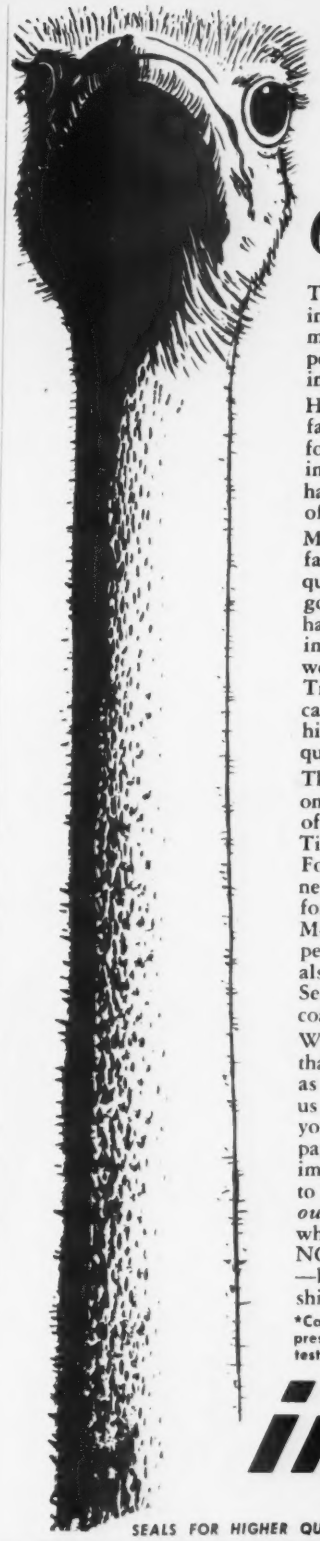

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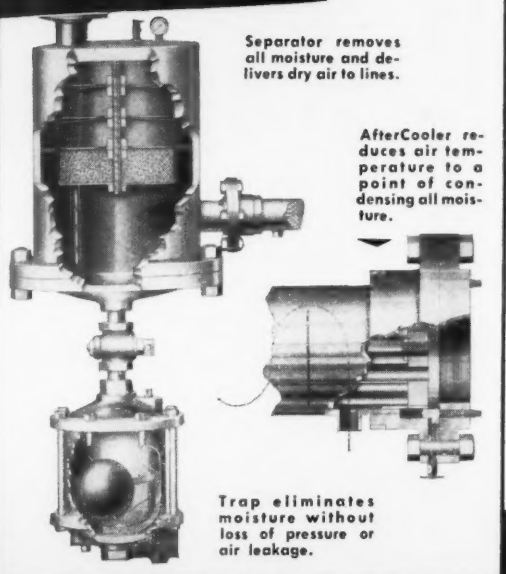
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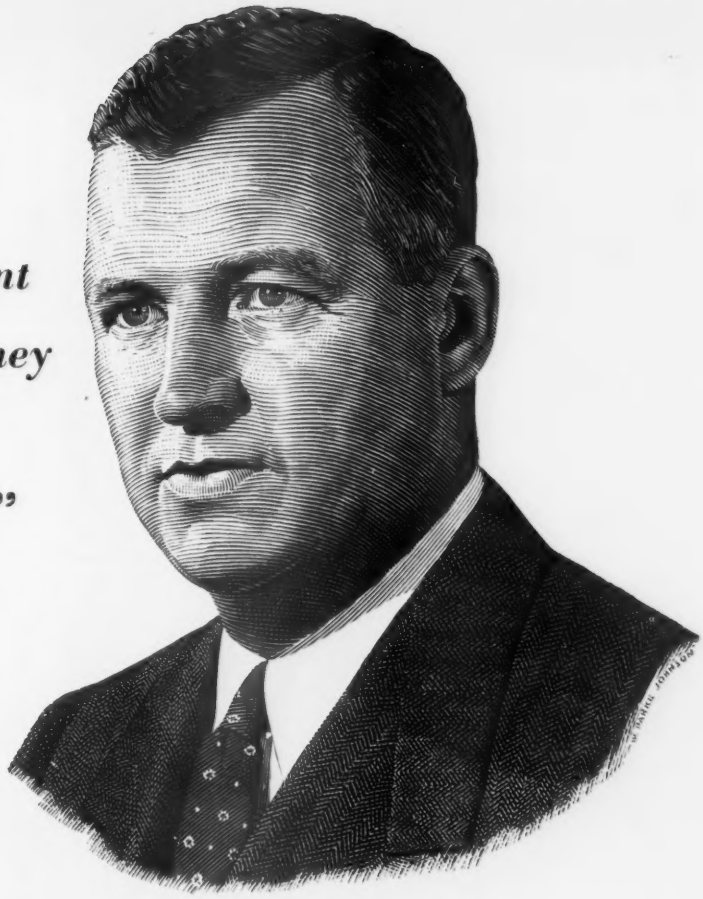

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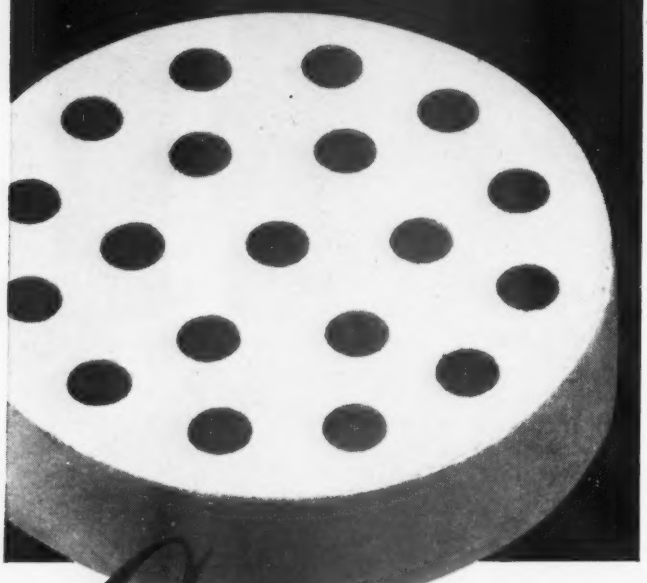

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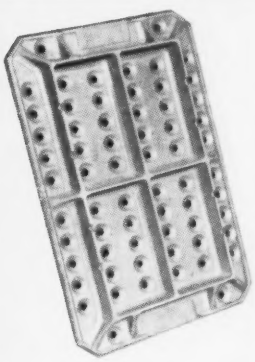

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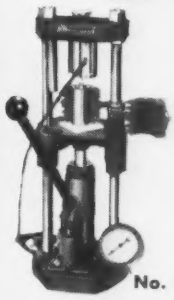

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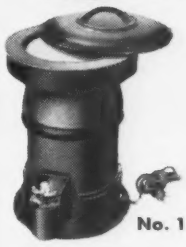

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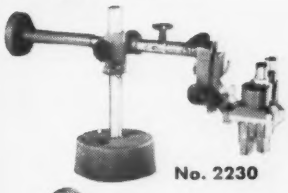

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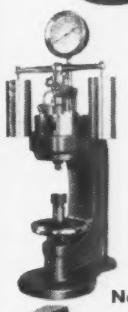

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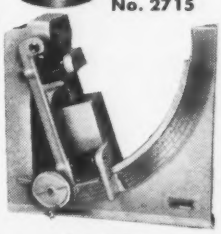

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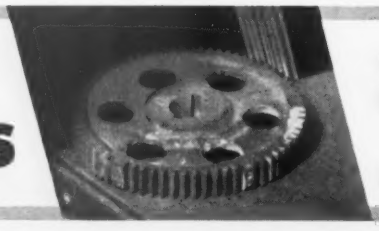

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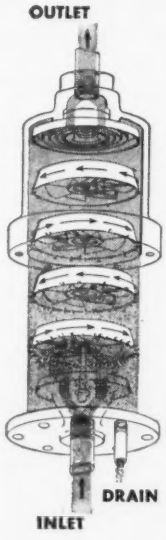

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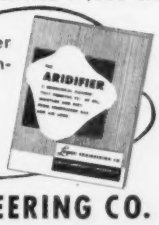

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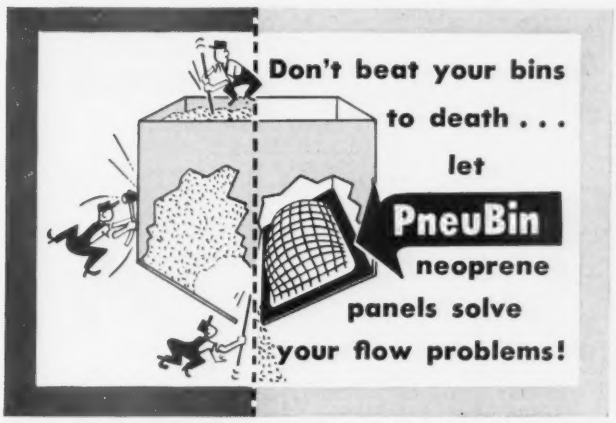

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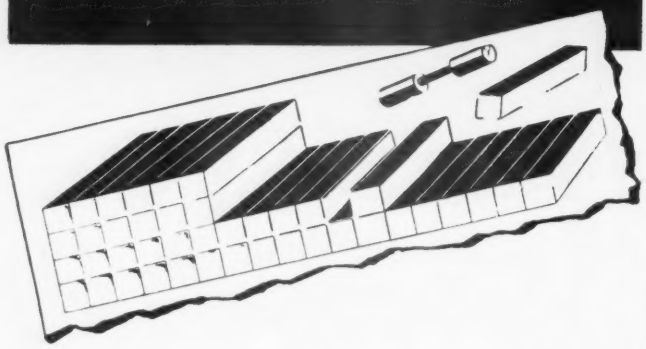

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Y.S.	22.5	20.0	21.2	20.6	20.5	22.0	20.8	21.0	21.8	22.5	23.0	23.4	23.0	25.0	23.8	22.5	23.5	24.6
T.S.	38.3	33.0	33.1	32.7	33.8	36.0	33.8	32.5	33.3	34.5	34.0	37.2	37.8	39.0	36.8	36.5	36.7	40.0
El.	12.5	10.0	6.0	4.0	7.5	7.5	8.0	7.0	7.0	7.5	7.0	8.0	8.5	8.5	7.5	8.0	7.5	10.0

	20	29	28	27	26	25	24	23	22	21	20	19
Y.S.	22.0	23.0	22.5	21.5	22.5	23.5	22.5	23.5	23.5	23.8	22.6	23.8
T.S.	36.3	35.3	35.3	35.0	35.0	37.3	34.5	32.0	32.5	32.5	35.0	38.3
El.	10.0	6.0	9.0	7.5	7.5	6.0	5.0	5.0	5.0	5.0	7.5	7.5

	31	32	33	34	35	36
Y.S.	23.0	22.8	22.5	24.0	23.5	23.0
T.S.	36.3	33.3	32.5	32.5	36.3	39.0
El.	8.0	5.0	5.0	5.0	7.0	8.5

	42	41	40	39	38	37
Y.S.	23.3	23.7	23.0	23.2	23.0	22.5
T.S.	33.2	37.1	36.4	37.3	39.0	40.8
El.	3.0	8.0	6.5	6.5	11.0	11.0

Separately-Cast Test Bar Properties		
NAT. AGED 21 DAYS	Y.S.	23500
	T.S.	36600
	El.	7.5

PROPERTIES OF CASTING (BASED ON TENSILE STRENGTH READINGS)			
	Maximum	Minimum	Average
Y.S.	25,000	22,500	22,700
T.S.	40,800	32,500	35,500
El.	11.0	5.0	7.5

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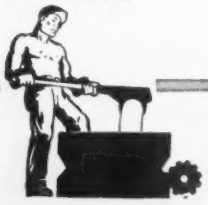

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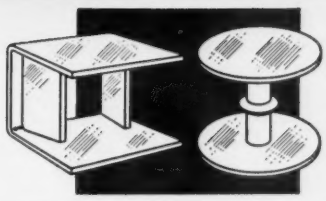

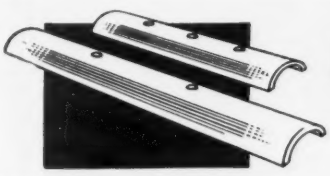

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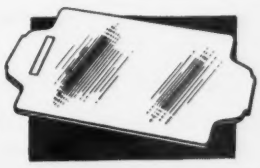
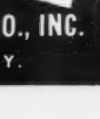


Complete information in Catalog No. 16 and other literature sent on request



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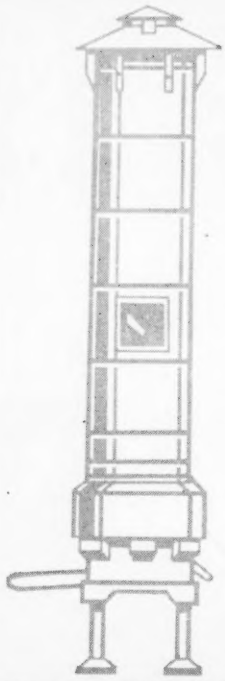

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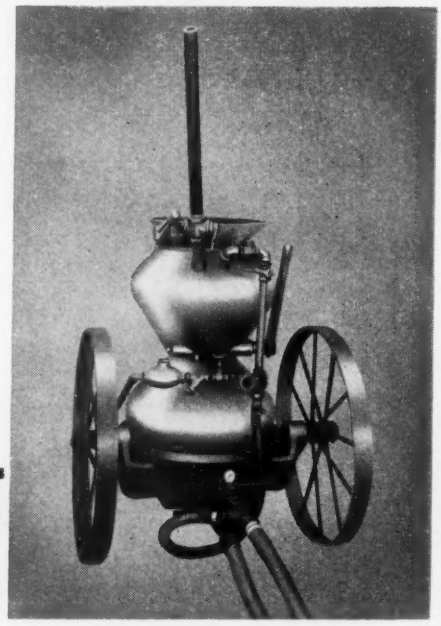

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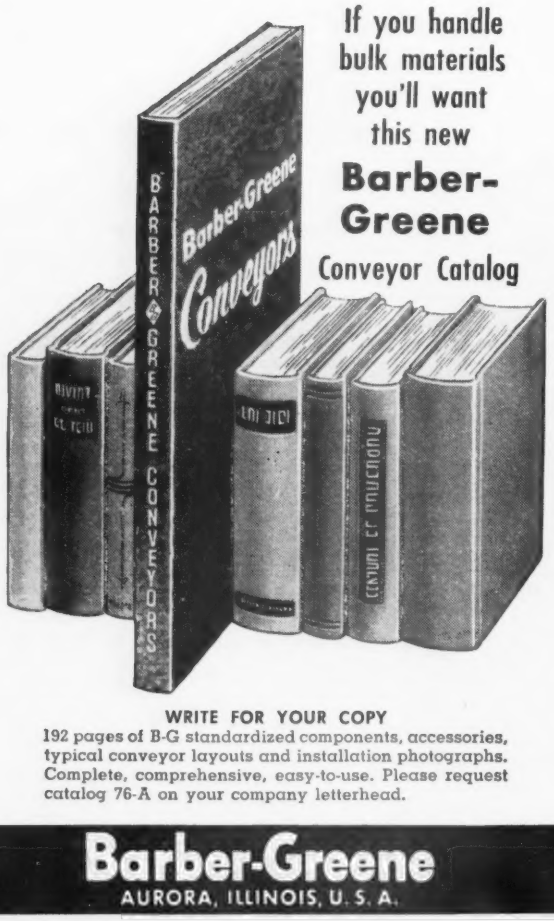

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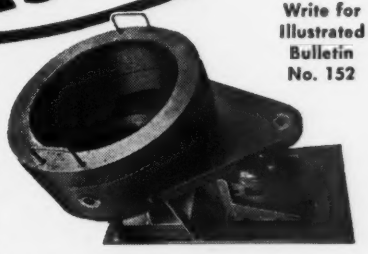

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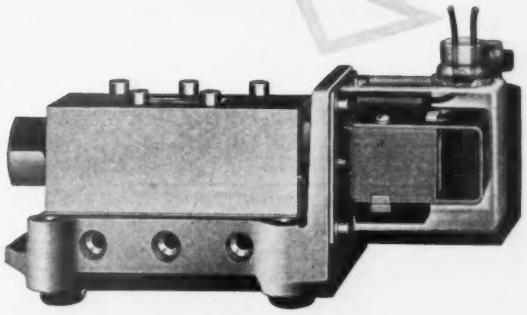

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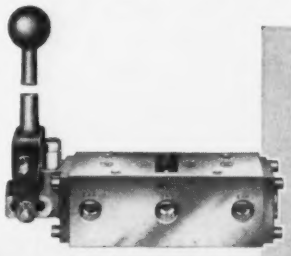

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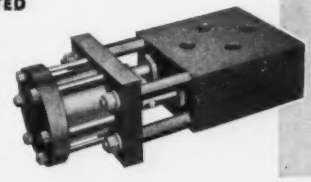

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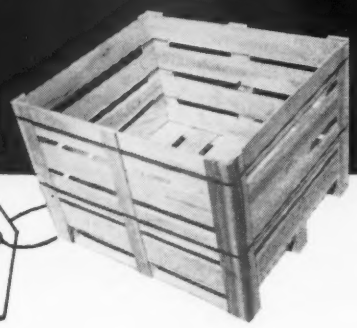

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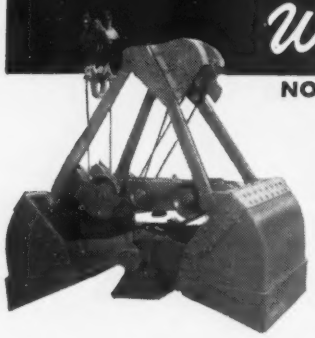

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CORE WORK, SAND FACINGS, SPRAYS

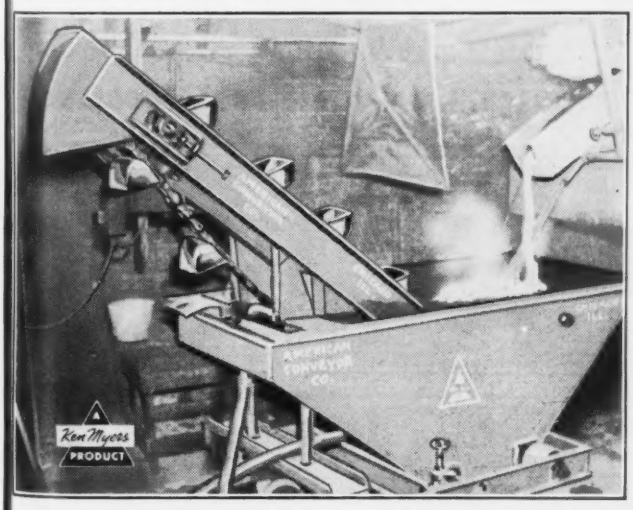
Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES: 500 FIFTH AVENUE • NEW YORK 18, N. Y.

APSDU* IN ACTION
AT A LARGE MIDWESTERN FOUNDRY



***AMERICAN PORTABLE SLAG DISPOSAL UNIT**

Water circulating quench tank transforms hot slag to cool granulated slag. Bucket line removes slag to cart, truck or to an American Conveyor.

- Eliminate expensive waterpits
- Eliminate troublesome recirculating pumps
- Eliminate dangerous handling of hot slag
- Eliminate foundry's most undesirable task
- Eliminate hours of manpower
- Low cost
- Pre-engineered
- Packaged unit
- Compact and rugged
- Alternate between cupolas

Phone or write for details on this important equipment!

AMERICAN CONVEYOR CO. 1117 W. ADAMS ST. CHICAGO 7, ILL.

SUCCESSFUL FOUNDRIES EVERYWHERE

ARE SAVING MONEY WITH

SAFCO Core Oils...

- ★ LOWER CORE AND CASTING LOSSES
- ★ REDUCE SHAKE-OUT TIME AND LABOR
- ★ CUT CLEANING ROOM COSTS
- ★ DECREASE BAKING TIME
- ★ REDUCE CORE GAS AND SMOKE
- ★ ELIMINATE CORE-BOX STICKING

Foundries of every type and size are cutting losses and saving money by putting a SAFCO core oil to work for them. In the comprehensive SAFCO line there is the correct oil to fit your foundry practice and give outstanding performance...

WRITE FOR FREE LITERATURE — TODAY!

OIL PIONEERS FOR OVER 100 YEARS

SWAN-FINCH OIL CORPORATION
205 EAST 42nd STREET · NEW YORK 17, N. Y.
BUFFALO · CHICAGO · DETROIT · MEMPHIS

Save on every Dollar!

● We'll make you a straightforward proposition: We will *Guarantee* your abrasive costs per unit of work blast cleaned will be at least 15% lower with Controlled T shot and grit *regardless* of the price you are now paying for chilled iron abrasives!

Controlled T costs more to make. *And because it does—it costs less to use.* Compared to conventional chilled iron shot and grit Controlled T lasts longer, cuts as fast or faster, is easier on your blast cleaning equipment—*and we can prove it.* And while we're proving it you save 15%. Write to the nearest Hickman, Williams office for proof and your complimentary copy of "A Primer on the use of shot and grit."

NATIONAL CONTROLLED "T" SHOT AND GRIT IS PRODUCED EXCLUSIVELY BY

THE NATIONAL METAL ABRASIVE CO.
Cleveland, Ohio

WESTERN METAL ABRASIVES CO.
Chicago Heights, Illinois

AND SOLD EXCLUSIVELY BY

HICKMAN, WILLIAMS & CO.
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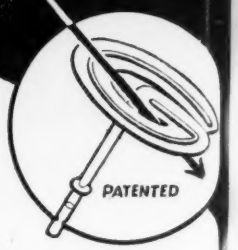
CLEVELAND Coil Head Shoulder Radiator Chaplet

OPEN HEAD



REDUCES CASTING REJECTS

Core support failures are minimized because you can pack sand better under head and around stem of this chaplet.

CLEVELAND CHAPLET & MFG. CO.
26470 Lakeland Blvd.
Cleveland 22, Ohio

WRITE FOR BULLETIN showing various types of Cleveland Chaplets.

CLEVELAND Chaplet
Since 1890

HAROLD E. PRIDMORE

P.O. BOX 137 PALO ALTO, CALIF.

Analyst for

MECHANICAL FOUNDRY PROBLEMS

PRODUCERS CORE SAND CORPORATION

PITS AT
MICHIGAN CITY, INDIANA
AND SAWYER, MICHIGAN

MICHIGAN CITY, INDIANA

ANDREA

TYPE 'R' CORE BOX VENTS

Slot Widths
.010 .014 .016 .018

The VENT with RECESSED HEAD and CHAMFERED LEADING EDGE affording easy insertion with less slot distortion plus maximum air passage.

All sizes with deep or shallow head or to your specification

ANDREA MANUFACTURING COMPANY
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CLASSIFIED ADVERTISING

Help Wanted | Help Wanted | Help Wanted

We are interested in acquiring personnel to be trained for supervision for the development of techniques and metallurgical procedures for melting, handling and casting of titanium and titanium alloys under a specially developed and licensed process. Previous experience in melting and alloying titanium and other refractory metals is essential. Metallurgical degree or its equivalent in experience in dealing with radiograph, physical and chemical analysis of titanium castings or titanium alloys. This position offers a challenging opportunity for a top-management supervisor's job with the largest ferrous and non-ferrous jobbing foundry in the United States. Liberal starting salary, paid vacation, group insurance and many other company benefits. To arrange an interview, please reply by letter stating age, education and salary requirements. Include resume of previous experience.

BOX 984

FOUNDRY **CLEVELAND 13, OHIO**

WANTED

METALLURGIST

With knowledge of shop practice, including molding, melting and sand control. No personnel problems.
Small steel casting foundry. City fifty thousand. Michigan.
Write setting forth qualifications and expected salary.

BOX 982

FOUNDRY **CLEVELAND 13, OHIO**

SUPERINTENDENT

Superintendent for middle western gray iron foundry melting 100 to 120 tons per day. Age 38 to 48 preferable. Engineering training desired but must have had plenty shop experience. Permanent position in outstanding organization.

BOX 953

FOUNDRY **CLEVELAND 13, OHIO**

FOUNDRY SUPERINTENDENT

Gray iron job foundry. Practical and technical knowledge in sand and nodular iron. Must have low scrap record and outstanding labor relations. Machine tool castings weighing up to 16 tons. Pouring up to 35 tons per day. Sixty employees. Excellent opportunity for top man. Address: Box 101, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

For malleable casting foundry in Eastern Pennsylvania, employing 225 men. To be in charge of air furnace batch type melting, sand control, and other details assisting plant manager. Write personal data, salary desired and resume of experience. Address: Box 980, FOUNDRY, Cleveland 13, Ohio.

PATTERN SUPERVISOR FOR SMALL SPECIALTY SHOP

Opening in university town central Illinois for pattern maker aged 25-45 capable of training apprentices and building up shop in working with research department in methods of more economically making better patterns. Address: Box 968, FOUNDRY, Cleveland 13, Ohio.

TIME STUDY ENGINEER

Nonferrous foundry located in Southeastern Pennsylvania. Minimum three years' foundry experience essential. Exceptional opportunity in new department of growing foundry. Enclose resume of education and experience in detail. State previous employment with length of service, references, age and starting salary desired.

BOX 979

FOUNDRY **CLEVELAND 13, OHIO**

PATTERN MAN

For gating and rigging wood and metal patterns and core boxes. To make repairs and changes—work with foundry superintendent to keep equipment in A-1 shape. Have complete new pattern shop, well equipped. Age required: 30 to 50 years. Aggressive medium size foundry. Address: **NOBLESVILLE CASTING COMPANY, INC., NOBLESVILLE, INDIANA.**

OPPORTUNITY

Young man for future managerial position. Person wanted with technical background, acquired either through formal education or a variety of training and experience. Will join our organization to gain experience in all phases of foundry operation and develop qualifications to assume position of Foundry Superintendent. We are an Ohio Corporation, established for over 75 years, and operate our own gray iron foundry. All sincere inquiries will be answered. Address: Box 988 FOUNDRY, Cleveland 13, Ohio.

CASTINGS SALES ENGINEER

Large independent producer of ferrous castings located in Northern Illinois has opening for qualified sales engineer. This position offers a salary plus commission and is direct factory representation. No agents need apply. Must be experienced and have appropriate background in terms of education and training. Please reply, giving full particulars as to personal data and business experience. Address: Box 989, FOUNDRY, Cleveland 13, Ohio.

TECHNOLOGIST

Experienced in cast iron and foundry practice. Prepared to travel. State salary required and full qualifications. Address: Box 924, FOUNDRY, Cleveland 13, Ohio.

WANTED

Foundry superintendent and manager. Must be qualified in all phases small gray iron production jobbing foundry. Replies confidential. Give complete job history and salary expected. Address: Box 975, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST

With experience in cast iron foundry practice. Prepared to travel. State age, experience, and salary reqquired. Address: Box 923, FOUNDRY, Cleveland 13, Ohio.

MOLDERS AND COREMAKERS

Established and well equipped gray iron foundry needs qualified journeymen molders and coremakers to work in one of Michigan's largest jobbing foundries. Castings weigh up to 35 tons.

BOX 972

FOUNDRY **CLEVELAND 13, OHIO**

WANTED

Metallurgist—chemist for iron foundry. Experienced in ductile iron and semi-steel. Good opportunity.

BOX 992

FOUNDRY **CLEVELAND 13, OHIO**

SALESMAN-SUPERINTENDENT

For nonferrous foundry. Give nationality, experience, age and references. Also salary expected. Chicago area. Address: Box 938, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

For steel foundry producing a variety of castings. Good knowledge of sand control and heat treating required. Write resume including age, background, education and experience. Address: Box 103, FOUNDRY, Cleveland 13, Ohio.

ENGINEERING GRADUATE

Young engineering graduate with two or three years foundry experience and an interest in technical writing to join editorial staff of technical magazine. Address: Box 960, FOUNDRY, Cleveland 13, Ohio.

IF YOU HAVEN'T FOUND JUST THE RIGHT JOB TO SUIT YOUR TALENTS LISTED IN THE ABOVE ADS, FOR A NOMINAL CHARGE YOUR AD CAN BE BROUGHT TO THE ATTENTION OF FOUNDRY EXECUTIVES EVERYWHERE.

Positions Wanted

FOUNDRY ENGINEER
Experienced in all phases ferrous and nonferrous. Desires position in management, supervisor or engineering. Can direct all phases of foundry activity, foundry processing, all departments, also estimating pattern equipment and castings from prints. Sand, per-mold and shell. Production processing of above. Seventeen years' experience, ten in management. Age 34. Address: Box 940, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN
Superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron and nonferrous jobbing and high production shops. Now employed. Western or central New York preferred but not essential. Address: Box 909, FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER
Mature, profit-minded, dependable. Have successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales, finance and production. Excellent experience, foundry machine and related lines. Address: Box 999, FOUNDRY, Cleveland 13, Ohio.

GENERAL FOREMAN
Large or small castings in gray iron or nonferrous, green or dry sand. Twenty years' practical experience in all foundry details. New Jersey. Address: Box 943, FOUNDRY, Cleveland 13, Ohio.

WORKS MANAGER—STEEL
Carbon, high or low alloy. Metallurgical background, labor relations and sales experience. All around foundry experience, low scrap records, reduced production costs, increased production. References, presently employed. Address: Box 986, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRYMAN
Supervisory capacity with twenty years' experience in all phases steel foundry. Producing steel castings ranging from 1 pound to 3 tons. Good knowledge of foundry equipment, foundry methods and mechanized production. Familiar with heading and gating and rigging of patterns for machine production. Married. Age 47. Address: Box 934, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN
Foundry or molding foreman. Twenty-five years' experience in all phases of steel foundry activities in high production shops. Age 44. Address: Box 957, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST SUPERVISOR
Degree in metallurgy plus a four-year foundry apprenticeship. Considerable experience dealing with nonferrous foundry problems and some supervision. Desire position in a technical or supervisory capacity. Age 30. Address: Box 997, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT OR FOREMAN
Desire position in gray iron shop. Well versed in cupola and sand control, jobbing or production shop. Age 41, twenty-two years' experience, fourteen years in supervisors position, two years M.I.T. Address: Box 981, FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC
Experienced in all phases of machine shop work, plant and equipment maintenance, have successfully developed preventive maintenance programs. Ability to handle men, over ten years' supervisory background. Married, age 37. Address: Box 942, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN
Twenty-two years experience in bronze and aluminum jobbing work. Stricktly jobbing. Thoroughly experienced in pressure work. Desire position in metropolitan area. May be reached any time. Age 41. Address: Box 104, FOUNDRY, Cleveland 13, Ohio.

WEIGHT ESTIMATING
Estimating of casting weights furnished by return mail. Accurate, reliable and confidential service. Automatic calculator equipment. Nominal fee. Send blueprints to: CHARLES E. ROLAND, ITASCA, ILLINOIS.

SUPERVISOR
Five years malleable and ten years gray iron experience as supervisor of agricultural, automotive and jobbing foundries. Thorough knowledge of all phases of foundry procedure. Address: Box 974, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST
Fifteen years experience as an all-around foundry worker, plus education in Metallurgy. Tech graduate June, 1952. Experience as metallurgist since graduation includes supervision of melting departments in gray iron cupola melting and mixes, chemical and sand testing, and nonferrous, brass and aluminum. Also knowledge of foundry practices and several years actual foundry work. Prefer position where company is progressive and opportunities exist for advancement. Excellent work record—dependable and ambitious worker. Age 41. Married. Address: Box 987, FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY EXECUTIVE
Well versed in all phases of foundry procedures available. Molding, light and heavy. Green and dry sand. Coremaking, cupola operation, gray iron metallurgy, foundry costs, customers contacts. Thirty years foundry executive experience various capacities. Presently employed. Address: Box 994, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR
Position wanted as gray iron foundry supervisor. Twelve years' experience in supervisory capacity. References. Address: Box 937, FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE
Experienced in all phases of foundry operation and management with thorough knowledge of each shop process, engineering, metallurgy, cost estimating and accounting, sales and industrial relations. Technical graduate. Excellent recommendations. Address: Box 100, FOUNDRY, Cleveland 13, Ohio.

WORKS MANAGER OR SUPERINTENDENT
Ferrous or nonferrous, well versed in all phases of foundry procedures in jobbing and high production shops. Experienced in labor relations, production and scrap control. Now employed as plant superintendent. Prefer Western New York but is not essential. Address: Box 991, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN
Ambitious young family man with good background in magnesium foundry seeking greater opportunity. Experience includes, material selection and evaluation, inventory control, cost reduction program, supervision of men and processes. Now employed at general foreman level. Address: Box 971, FOUNDRY, Cleveland 13, Ohio.

SUPERVISOR
Industrial management engineer currently away desires to return to foundry in growth position where ability and experience with sand control, quality control, mechanization, administration and skillful handling of manpower can be best utilized. Address: Box 970, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Foundryman with thirty years' practical experience, eighteen years' supervisory, from foreman to general manager. Experience in gray iron and nonferrous metals. Well versed in rigging and gating patterns for fast production and quality castings. Address: Box 998, FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER
Graduate metallurgist with experience in gray iron, brass, steel and malleable. Now hold executive position and wish to make connection with progressive firm. Address: Box 102, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN
Twenty-two years' experience on jobbing work. Bronze, aluminum and high pressure valves. Age 40. Prefer metropolitan area. Address: Box 976, FOUNDRY, Cleveland 13, Ohio.

MALLEABLE FOUNDRYMAN
Age 32. Engineering graduate trained in leadership. Seven years' malleable experience, both non-mechanized and high production operations. Experience covers sales, cost calculations, pattern layout and gating, timestudy, personnel, purchasing, press straightening and finishing, sand control. Plenty of supervisory experience. Will relocate. Address: Box 109, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE
Thoroughly experienced in the management of gray iron production or jobbing foundries. Qualified to show you a highly efficient and low cost operation. If you are interested, Address: Box 951, FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL ENGINEER OR TECHNICAL SUPERINTENDENT
Well qualified to supervise the Standards and Methods. Also broad experience in general foundry practice. Cost reduction and increased production can be expected. Address: Box 10[illegible], FOUNDRY, Cleveland 13, Ohio.

WANTED
Position as first helper or melter. Acid or basic, open hearth or electric furnace. Prefer East or South. Address: Box 930, FOUNDRY, Cleveland 13, Ohio.

GRAY IRON-NONFERROUS
Mechanical engineer with practical foundry background. Experience in all phases of producing jobbing and production castings. Well versed in metal control, sand control and molding procedures. Forty-eight years of age. Desire position of top responsibility. Address: Box 107, FOUNDRY, Cleveland 13, Ohio.

TECHNICAL GRADUATE 48 YEARS OF AGE
Practical experience in all foundry departments. Top supervisory experience in both jobbing and high production of automotive and pressure castings of malleable iron. Thorough knowledge of gating, sand control, metal control, annealing and molding techniques. Address: Box 108, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE
Young executive with 19 years in gray iron foundry. Wide experience in personnel, wage and salary incentives, timestudy, job and merit rating, standards, labor control. All phases of industrial relations and industrial engineering. Age 39. Desire new connection in foundry industry. Address: Box 110, FOUNDRY, Cleveland 13, Ohio.

Representatives Wanted

REPRESENTATIVES WANTED
Manufacturers' agents or sales representatives familiar with melting, heat treating, and dust suppression phases of the foundry industry to represent us in the following territories: Ohio, Western Pennsylvania, West Virginia, Kentucky, Virginia, North and South Carolina, Utah, Montana and New England. Commission basis. National advertising to back you up. Literature and company background upon request.
BOX 969
FOUNDRY CLEVELAND 13, OHIO

MANUFACTURER'S REPRESENTATIVE WANTED
Leading manufacturer of fabricated steel flasks needs additional representation.
Several openings in excellent territories available.
Direct all inquiries to:
INDUSTRIAL & FOUNDRY SALES, INC.
P.O. BOX 71
EATON RAPIDS, MICHIGAN

SALESMAN
To represent well-established company on sales of binders, fillers, flux and facings in the Cleveland area. In reply state age, experience and give references. Address: Box 964, FOUNDRY, Cleveland 13, Ohio.

SALESMAN
Calling on foundries in Chicago territory to handle very profitable line. Wonderful repeat orders. Write complete qualifications and past experience selling foundries. Address: Box 922, FOUNDRY, Cleveland 13, Ohio.

SALESMAN WANTED
Eastern steel foundry has opening for experienced inside salesman familiar with alloys and having aggressive sales technique. Address: Box 993, FOUNDRY, Cleveland 13, Ohio.

REPRESENTATIVES WANTED
Sales representatives wanted for nonferrous plaster mold precision casting foundry. Address: Box 966, FOUNDRY, Cleveland 13, Ohio.

Opportunity

OPPORTUNITY
If you are considering the operation of a small steel foundry either by adding an electric furnace to your present iron foundry or as a new venture answer this ad. Have many years of successful foundry experience and know how it can be accomplished and the equipment required and also the small amount of capital necessary. This applies in any country. Steel casting is a profitable business. Address: Box 985, FOUNDRY, Cleveland 13, Ohio.

CLASSIFIED ADVERTISING

Employment Service

FOUNDRY PERSONNEL SPECIALISTS
National Placement and Procurement of

PLANT AND GENERAL MANAGERS
PLANT SUPERINTENDENTS
FOREMEN—ALL DEPARTMENTS

ADMINISTRATIVE-STAFF POSITIONS

ENGINEERING: METALLURGICAL MECHANICAL, INDUSTRIAL

SALES AND SALES MANAGEMENT

CONFIDENTIAL INQUIRIES INVITED FROM EMPLOYERS AND QUALIFIED CANDIDATES

For Fast Competent Assistance Contact

JOHN COPE, DIRECTOR
IMPERIAL PERSONNEL
37 S. WABASH, CHICAGO 3, ILL.
FRANKLIN 2-4233

SALARIED PERSONNEL

$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: **JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.**

Available Capacity

CONTRACT MANUFACTURING FACILITIES AVAILABLE FOR

CUSTOM-BUILT
MEDIUM AND HEAVY
MACHINERY

Steel Fabricating Shop—Gray Iron Foundry
Pattern Shop—Machine Shop

OPEN TIME NOW
QUALITY WORKMANSHIP—PROMPT SERVICE

Engineering Service Available
For Complete Information, Write, Wire or Phone

ROBERT HOLMES & BROS. INC.
1-F JUNCTION AVE., DANVILLE, ILLINOIS

OPEN CAPACITY

For machinable iron castings, products manufactured. Address: **SOUTHERN BARBELL MFG. CO., P.O. BOX 156, RICHMOND, VIRGINIA.**

Wanted-To-Buy

WANT TO BUY

Always in the market for surplus used foundry equipment. Contact us before selling. Interested especially in complete plants. Will go anywhere.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON, PA.
PHONE: READING 7-1321

MACHINERY WANTED

Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: **P.O. BOX 1351, CHURCH STREET STATION, NEW YORK 8, NEW YORK.**

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED
ROOTS-CONNERSVILLE
POSITIVE BLOWERS

GREENE BROTHERS
511 FREEMAN CINCINNATI 3, O.
PHONE: MAin 2192

WANTED

1—Osborn #605 jolt rollover pattern draw molding machine.
2—Tabor jolt rollover pattern draw, 30" x 40" tables, portable type molding machines.
2—Osborn #444 portable jolt rollover machines.
1—Hough Payloader.
1—No. 2 Simpson Mill.
1—No. 3 Simpson Mill.
2—S.P.O. pin lift molding machines. Portable type.
1—American 36 x 42 wheelabrator.

MARCH-BROWNBACK CO., INC.
POTTSTOWN, PENNSYLVANIA

WANTED
STEEL SHOT & GRIT
ANY GRADES—ANY SIZES

BEMCO COMPANY
511 FREEMAN CINCINNATI 3, O.

WANTED TO BUY

Electric arc furnace, half to one ton capacity, 150-200 KW. Automatic positioning preferred.

H. A. BRASSERT & CO.
60 EAST 42nd STREET
NEW YORK 17, NEW YORK
MU 2-1720

WANT TO BUY

Sand cutter or Moulder's Friend in good order.
State year, model, condition and price.

STE-CROIX FOUNDRY
STE-CROIX
LOTB. CO.
P. QUE. CANADA
TEL. 36—PAUL BIRON

WANTED TO BUY

One late model #3 Simpson Mixer with or without cooling hood. Must be in good running condition.

THE FOREST CITY FOUNDRIES COMPANY
2500 WEST 27th STREET
CLEVELAND 13, OHIO

WANTED TO BUY

Profitable gray iron foundry located in Middle West producing squeezer or light roll-over castings. Equipment and business only. No real estate.

BOX 977
FOUNDRY CLEVELAND 13, OHIO

WANTED

Used induction furnace for ferrous metals. Holding capacity in range of 500 to 1000# desired.
Advise age and make and all details regarding electrical equipment.

BOX 978
FOUNDRY CLEVELAND 13, OHIO

WANTED TO BUY

Used Wheelabrator or Pangborn, 8', 10' or 12' diameter table room.

BROOKS FOUNDRY, INC.
1712 E. MICHIGAN AVE.
ALBION, MICHIGAN
PHONE: 2167

Wanted-To-Buy

WANTED

Operating mechanized foundry serving the New York Metropolitan area.

BOX 965
FOUNDRY CLEVELAND 13, OHIO

WANTED

2—B&P Mulbaros or 2 Simpson Porta mullers
1—#1½ or 2 or 3 sand muller. Must be unit drive type, with or without skip hoist.
1—American Wheelabrator 27" x 36" Tumblelast machine.
1—B&P Sand Slinger, stationary or motive, 16"-19"-22" head.
Will pay top price for all or part of the equipment listed.

BOX 105
FOUNDRY CLEVELAND 13, OHIO

Foundry Work Wanted

LOWEST COST

Top quality guaranteed. Foundry and machine shop work. Low taxes. Low wage scale. Send drawings for prompt low price quotation. Address: **AMERICAN FOUNDRY AND MACHINE SHOP, APARTADO 2610, MEXICO CITY, MEXICO.**

Foundries For Sale

SMALL FOUNDRY FOR SALE

On New York Central Railroad side track in Lockport, New York. Floor space of molders approximately 11,000 square feet with exceptional dumping ground for disposal of slag and waste indefinitely at lowest expense over declivity on the land. Considerable foundry equipment thrown in for the price of assessed value of the real estate. Address: **JEFFERSON UNION COMPANY, LOCKPORT, NEW YORK.**

SHELL MOLD FOUNDRY FOR SALE

Complete shell mold nonferrous foundry equipped for both production and development work. Available as is with accounts, or equipment only.

BOX 995
FOUNDRY CLEVELAND 13, OHIO

FOR SALE OR LEASE

Well mechanized gray iron foundry located in the Delaware Valley District of Pennsylvania. Approximately 18,000 sq. ft. under roof, adaptable to any type sand cast metal. Present volume $175,000 per year. Interested principals only please. Address: Box 931, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Brick and steel foundry, Southern Illinois, 160 x 320 feet, overhead monorail, water transportation available. Ideal for mechanized operation, contains equipment. Address: Box 920, FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY

New 51,000 square foot building on railroad spur. Everything modern. Pour 8 tons per hour. Have contracts. Located Southwestern Ohio. Heirs selling to operate other business. Showing good profits. Good labor market.

GREENE BROTHERS
511 FREEMAN
CINCINNATI 3, OHIO
PHONE MA. 2192

Pattern Shop For Sale

WOOD AND METAL PATTERN SHOP FOR SALE

To settle estate due to the death of owner. Plant in continuous operation since 1918. Immediate possession; use of tradename. Space occupied by pattern shop can be leased up to five years.

Equipment includes machines, motors and supplies. Mahogany and Northern Pine pattern lumber.

Building is sprinkler protected, has freight elevator and loading dock. Located in commercial district with many foundries and machine shops. Railroad on two sides of building.

Would consider selling both building and pattern shop to one party.

FOR APPOINTMENT WRITE:
MRS. ARTHUR L. SEWARD
SEWARD PATTERN WORKS
501 WALBRIDGE STREET
KALAMAZOO, MICHIGAN

For Sale

REBUILT AND GUARANTEED EQUIPMENT

1—**WHEELABRATOR** 27 x 36" with Skip Hoist and Dust Collector.
2—**CLEARFIELD MULLERS** #920; 60 HP motors.
2—**B & P SAND SLINGERS,** 19" and 16" Heads.
9—**CORE OVENS:** Gas and Electric, all types.
2—**DIELECTRIC CORE OVENS** latest: conveyor type.
2—**HEWITT-ROBINS SHAKEOUTS,** pan conveyor type.
1—**WHITING CUPOLA** #8 complete with G.E. Blower.
1—**WHITING CUPOLETTE** complete with blower.
1—**WHITING SKIP CHARGER** with Loader and 2,000 lb. **KRON** Scale and Bucket.
2—**SIMPLICITY SHAKEOUTS,** 4 x 8'.
1—No. 3 **SIMPSON MULLER.**
1—No. 2 **SIMPSON MULLER.**
1—40 HP Sullivan **AIR COMPRESSOR.**
9—**SAND BELT CONVEYORS**—2 **ELEVATORS.**
1—75 Ton **P & H LADLE CRANE.**
SEVERAL TESTING MACHINES, LABORATORY EQUIP.

MOLDING MACHINES

6—**SPO** 110J Portable Jolt Squeezers — **LIKE NEW.**
2—**TABOR POWER ROLLOVERS** 30 x 40" table, port.
1—**MILWAUKEE** Jolt Rollover 30 x 40" table.
3—**MILWAUKEE** Jolt Strippers 32 x 38" table.
10—**OSBORN** 275J Portable Jolt Squeezers.
4—**HERMAN** Rollovers: 60 x 80"; 40 x 60"; 144 x 96".
6—**OSBORN** Rollover & Jolt Strippers; var. sizes.
2—**JOHNSTON & JENNINGS** #2 Jolt Squeeze Strippers.
CORE BLOWERS: ALL SIZES. Send for List.

FURNACES

2—**FISHER TILTING:** 225 & 400# Crucibles.
5—**HAUSFELD TILTING:** Various capacities.
7—**MONARCH** #93 Barrel Type, Tilting.
1—**AJAX INDUCTION:** Alum. Melting, 400# Cap.
1—**AJAX INDUCTION:** Stainless, 600#, 960 Cy.
3—**AJAX-TAMA-WYATT:** 333 KW for alum. **LIKE NEW!**
Several **ARC MELTING FURNACES** from 150#-15 T.
250 Tons of Steel **FLASKS**—send for listing.
LADLES: 1,000# to 45 Tons capacity.

ENGINEERED MECHANIZED SAND HANDLING SYSTEMS

Send for our complete Foundry Equipment List. New items continually added. Our lists will interest you!

UNIVERSAL MACH. & EQUIP. CO.
320 EAST BROAD ST.
SHILLINGTON, PENNSYLVANIA
PHONE: READING 7-1321

FOR SALE

One Ingersoll Rand Type FS—563 Blower, direct connected and roller pedestal bearing construction. Serial #S563-J-10, 11,000 CFM, 1.5 lbs. pressure, 3500 RPM complete with 100 HP Fairbanks Morse motor, Type QZC. 3450 RPM. Used only a short time.

Several 42" dia. x 72" Type "C" Sly Tumbling Mills. Direct and V-Belt drives, with or without motors.

Both items very reasonably priced.

NEW HAVEN FOUNDRY
NEW HAVEN, MICHIGAN

For Sale

FOR SALE

MOLDING MACHINES
1—Plain jolt machine, 60" x 72" table, 16" cylinder.
2—No. 275 Osborn jolt squeezers.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
1—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.
BLOWERS FOR CUPOLAS AND FURNACES
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.
METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.
MISCELLANEOUS
1—Beardsley & Piper, Model S Screenerator.
1—Stoney crane type shakeout.
1—NC-4 Royer sand separator.
1—#1 Demmler core blower.
2#16 Roto-clone units complete.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—30 x 48 tumbling mill.
1—36 x 48 tumbling mill.
1—Nat'l. Eng. skip hoist.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE
TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
4500	16 oz.	G.E.	400	16 oz.	Spencer
3500	40 oz.	Spencer	400	4.3 oz.	Spencer
2800	1 oz.	Spencer	340	20 oz.	A-B
2700	16 oz.	Spencer	320	12 oz.	Spencer
2500	7 oz.	Sturt.	225	16 oz.	Spencer
2000	2½ oz.	Spencer	180	15 oz.	Spencer
2000	1 oz.	Spencer	110	16 oz.	Spencer
1300	16 oz.	Spencer	9100	7" SP	Sturt.
1150	20 oz.	No.Am.	2344	2" SP	Clarage
675	16 oz.	No.Am.	1100	4½" SP	Bayley
660	20 oz.	A-B	100	7" SP	Spencer
500	10 oz.	No.Am.			

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

ATTENTION:

PNEUMATIC TOOL USERS

200 never used tools and many hundreds of rebuilt Chippers, Rammers, Riveters, Grinders, etc. at substantial savings.

Very large stock of spare parts, Standard and O/S.

Complete repair service on your tools by refitting parts or rebuilt to original sizes with HARD CHROME.

30 years' experience handling all makes and models.

Send us your next tools as a trial. Satisfaction guaranteed or money refunded. Estimates furnished.

THE PNEUMATIC TOOL PRODUCTS CO.
1340 EAST 222nd ST.
EUCLID 17, OHIO
PHONE: KE 1-4990

FOR SALE
DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb. cold metal or 2,600 lb. hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: **HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.**

FOUNDRY EQUIPMENT
MOLDING MACHINES

1—Herman Jolt Rollover #6000, 40" x 60"—late.
2—Herman Jolt Strippers, 48" x 54"—late.
1—Osborn 405 Rollover with Roll Out Car.
1—Osborn 332 Jolt Rollover.
3—SPO 110J Squeezers.
2—Osborn 275J Squeezers.
1—Osborn 75J Squeezer.
8—Tabor Split Pattern Squeezers.
4—Haynes Squeezers.
1—Milwaukee Squeezer.
2—Adams 12 x 38 Squeezers.
29—Osborn 2047-4 Jolt & Draw.
1—Tabor 31 x 40 Rollover—portable.
2—Int'l 24 x 30 Rollovers—portable.

SAND HANDLING EQUIPMENT

1—B & P 13' tractor sand slinger.
#3 Simpson Muller.
2—50" Dia. Single Wheel Simpson Mullers—Belt.
B & P Screenarator, Model M.
2—Jeffrey Sanditioners.
18", 24", 36" Belt Conveyors, 10' to 150' Centers.
Unit A Syntron Feeder Hopper, 6' x 6'.
2—Aerators, Overshot type, 9' x 2' x 4' x 3'.
Aetna Sperser System.
Simplicity Shaker, model C.
Simplicity 4 x 8 Sand Conditioner.

CRANES & HOISTS

Curtis Traveling Bridges, 15' span.
Curtis Air Hoists, 4" to 15" dia.
Electrified Monorail.
Elec. Hoists, ⅛ ton to 3 ton.
Air Hoists, to 3 ton.

BLOWERS

10,000 CFM @ 48 oz., Spencer Turbo.
6350 CFM @ 32 oz., Ingersoll Rand.
3900 CFM @ 20 oz., Whiting.
3500 CFM @ 40 oz., Spencer Turbo.
3600 CFM @ 16 oz., No. American.
2250 CFM @ 16 oz., Spencer Turbo.
1900 CFM @ 8 oz., No. American.
Roots-Connersville Blowers 4000 to 17000 CFM.

MISCELLANEOUS

Hough Payloader.
14' dia. Pangborn Tablast.
15,000 CFM Dust Collector.
10,000' 458 Conveyor Chain & Trolleys.
Schramm 25 HP Air Compressor.
30" Modern Pouring Devices.
8—Combs 20" Gyratory Riddles.
1500' Hevi Duty 10" Roller Conveyor, 2½" dia.
300' Hevi Duty 10" Roller Conveyor, 3½" dia.
Ladle Preheaters, 12 unit.
Chaplets—all types.
30# & 50# Mold Weights.
2—#9 Whiting Cupolas.
Geared Ladles—to 10 tons.
2—Int'l SB11 Core Blowers.
Demmler #1 Core Blower.
Champion Core Blower, model CB400, 300 lb.
Brinell-Rockwell-Riehle Testers.
1—12 x 12 Pangborn Sand Blast Room, with Dust Collector.
1—400# Detroit Electric Furnace.
2—6000# Automatic Transporters.
Baker Lift Truck, 6000# cap., 1948.
Yale Lo Lift, Redi power.
Logan Wood Slat Conveyor, motorized, 36" x 35'.
Diamond Grinder, horizontal.
15—Double End Grinders.
#124 Gardner 53 Horiz. Grinder.
1—Standard Buffer & Polisher—late.
Tons of Flasks.
Perforated Steel Core Plates.
2—48 x 72 Jeffrey Vibrator Feeders.
Vibrators, Osborn, 1⅝" & 2".
1—McLeod Tumbling Barrel.
3—Whiting 30 x 60 Tumbling Barrels—late.
2—Sand Cutters, model M.
Bottom Dump, Sand Buggies.

WE WILL BUY—FROM 1 PIECE UP TO ENTIRE FOUNDRY

GREENE BROTHERS
(FORMERLY ASSOCIATED WITH ALLIED MATERIALS HANDLING CO.)
511 FREEMAN CINCINNATI 3, OHIO
PHONE: MAIN 2192.

CLASSIFIED ADVERTISING

For Sale

FOR SALE
CORE BLOWERS

#91 Osborn—for small cores	$ 650.00
#193-4 Osborn—for medium cores	1250.00
#94 Osborn—for large cores	2000.00

FORK LIFT TRUCKS

15,000 lbs. Hyster Fork Lift Trucks	3500.00
6,000 lbs. Clark Fork Lift Trucks	1200.00

MOLDING MACHINES

Herman Jar Rollover & Pattern Draw Molding machine; new in 1944; 48" x 144"—10,000#	9500.00
Herman Jar Rollover & Pattern Draw machine 80" cap.; 6000# Series	1500.00
30" x 36"—#1500 Eeries Hi-Speed Herman 8½" cylinder; 16" draw	1500.00
#2047-3 Osborn Jolt Rollover	275.00
#601-13 Osborn Jolt Rollovers	275.00
#413-3 Osborn Jolt Rollover; 130" x 42"	5000.00
#275 J Osborn Jolt Squeezers	125.00
#405 Osborn Jolt Rollover, 40" x 72" cable	OFFER

WHEELABRATORS

20" x 27" American Wheelabrator	1500.00
27" x 36" American Wheelabrator	2000.00
48" x 48" American Wheelabrator	OFFER

MISCELLANEOUS

Dielectric core oven, latest type	OFFER
#2 Climax Wire tSraightener	250.00
Marschke Swing Frame Grinder-10 HP	550.00
#6 Whiting Cupola Blower	550.00
Beardsley & Piper Tractor Type Sandslinger with magnetic tower—13' arm	4500.00
Despatch Core oven — Batch type — double oven-outside dim. 16" square; inside dim. 6" each side; with controls & blower	OFFER

FOR THE BEST DEAL
CALL
BALCHER MACHINERY COMPANY
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO
TELEPHONE: FAIRMOUNT 1-1186

BUY—TRADE—SELL

48 x 42 Wheelabrator tumblast	$3,000.00
8' Wheelabrator air table	2,000.00
9' Wheelabrator table blast with smaller tables and 2 throwing wheels	2,500.00
8' Wheelabrator table blast without motors	2,000.00
4' Wheelabrator table blast	1,250.00
3½ GK2 Pangborn rocker barrel	2,500.00

Also all types of Hand Cabinets, Dust Collectors and Pressure Tanks.

If interested in trading your present equipment on any of the above, Call or Write:

DIAMOND SAND BLAST, INC.
5654 W. JEFFERSON
DETROIT 9, MICHIGAN

X-RAY FILM

For industrial radiography
Kodak single coated
blue sensitive
100 sheet packages—4" x 10"
Expiration dates—June to December 1952
Guaranteed subject to your test
Regular price $13.33 per package
Our price $5.00 for sample package
Quantity prices quoted on application
2000 packages available

I. G. PROCESS CO.
46 RIDGE STREET
NEW YORK 2, NEW YORK
PHONE: GRAMERCY 3-7776

TESTING MACHINES

1—Riehle 400,000# hydraulic and beam type Compression Testing Machine
1—Riehle 200,000# Universal
2—Riehle 100,000# Universal
1—T. Olson 100,000#
Also Simpson Sand Mixers 18" dia. Laboratory, #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.
OUR 36th YEAR

CONSOLIDATED PRODUCTS CO., INC.
OBSERVER HIGHWAY & BLOOMFIELD ST.
HOBOKEN, N. J.
HO 3-4425 N.Y. TEL. BA 7-0600

For Sale

WE HAVE THE FOLLOWING ELECTRIC FURNACES PRICED FOR IMMEDIATE SALE:

One 500# Moore Lectromelt, size T, type 4, Moore Rapid Lectromelt controls—Penn. transformer 3 ph.—60 cy., type OIWC—H.V. 2300, L.V. 595.

One 6-ton Swindell Electric Arc Melting Furnace 112" dia., 12' in height, 3' door opposite tap hole tilted by power control unit with 35 H.P. G.E. motor for pouring—G.E. controls, 250 V. D.C., 3 ph./60 cy., amp. pri. 10,000—KVA 1800—Westinghouse transformer 3 ph.—oil insulated 2500 KVA, 11,000 volt primary—200 volts secondary—250 volt D.C. generator—

FOR FURTHER INFORMATION CONTACT:
LeTOURNEAU—WESTINGHOUSE COMPANY,
TOCCOA, GEORGIA
MR. R. M. MITCHELL

GOOD MACHINES AT LOW PRICES

Must sacrifice to settle estate at once.

Heavy duty Hammond Snag Grinders, w/(2) 5 HP Motors and hoods.
LIKE NEW Climax #2½ wire straightener.
14 oz. Mahrs pressure blower w/15 HP motor.
Old but in excellent condition, production belt sanding machine with motor.
Blowers, Manganal stock for conveyor hooks.

WIRE—PHONE—WRITE

WM. R. SHIELDS CO.
1347 WORDSWORTH AVE.
DETROIT 20, MICH.
JORDAN 6-0770

FOR SALE

1—North American M.F.G. Co. blower, 2 HP motor, 275 CFM, 16% press.
1—5 HP stand grinder.
2—Tabor hand rollover air jolt, foot draw core machines.

WRITE:
GEORGE HILLIS
3220 MIAMI AVENUE
KALAMAZOO, MICHIGAN

FOR SALE

3—Modern Equipment Co. ladle pouring devices.
1—30" dia. two wheel vertical face grinder or sander.
6—Jolt squeezers S.P.O. and Osborn.
1—8½ ton iron ladle, lip pour, open gearing, excellent condition.

AMERICAN CAST PRODUCTS, INC.
ORRVILLE, OHIO

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell.

BAER STEEL PRODUCTS, INC.
BOX 1428
BOISE, IDAHO

FOR SALE

Slightly used Multi-Table
Wheelabrator

THE GENERAL INDUSTRIES COMPANY
ELYRIA, OHIO

WHITING #4 CUPOLA

This cupola was never installed and is in same shape as day it left Whiting plant. It presents a value saving opportunity for foundry interested in a cupola. Address: **PIONEER FOUNDRY COMPANY, JACKSON, MICHIGAN, PHONE 2-9469.**

FOR SALE

Clearfield #404, floatex shakeout 48 x 72, B & P sand conditioner cap. 60 tons per hour, 2 Stroman gas furnaces and blower, many other items in excellent condition. Address: **SOMIL EQUIPMENT & SUPPLY CO., 620 MARQUETTE AVE., SO. MILWAUKEE, WISCONSIN.**

For Sale

FOR SALE

1—American Air Filter Roto-clone No. 24 complete.
1—Pangborn Sandblast, 10 x 10 room complete.
Both now operating in foundry which needs the space.

BOX 967
FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Furnace Charger

Hyster Gasoline Operated, hydraulically controlled furnace charger, pneumatic tired, 1500# capacity, practically new.

MAYER POLLOCK
POTTSTOWN, PA.

FOR SALE

1—American Wheelabrator Tum-Blast machine, size 48" x 48", serial #A30146. Arranged for skip loading device. Model 4N42S.
1—Pangborn #4-CC, serial #332590 dust collector 7'-6" x 10'-0" x 7'-6" reinforced steel casing with two 4' bottom hoppers, motor rapping device. Without blower and motor.

CRUCIBLE STEEL CASTING COMPANY
2850 S. 20th STREET
MILWAUKEE 15, WISCONSIN

FURNACES AND BLOWERS

5—#400 Fisher type, hand tilting, crucible type, Nose pouring, oil fired, 5 Hauck burners, 2 blowers.
1—#600 Stroman, tilting, spare shell, burner and blower.
1—#225-C Bellevue, never used, tilting, complete with crucible and burner.
2—Blowers Lindberg-Fisher, 7½ H.P., 550/-3450/3/60.

RONCI MFG. CO., INC.
44 CROSS STREET PROVIDENCE, R. I.

FOR SALE

4—Type "G", 20" x 8", air jolt, air rollover International Molding Machine, also 1 machine, size 24" x 10".
1—American Foundry Equipment Co. sand cutter, Model M, 60" swath, all electric.
All machines in good condition.

BAYER FOUNDRY, INC.
SCHOFIELD, WISCONSIN

CHIPPING HAMMERS FOR SALE

(1) Chicago Pneumatic Simplate Valve Hammer, size #1. (1) Chicago Pneumatic New Boyer, size BK1. (2) William H. Keller, Inc., size 2x. Most of these tools have never been used. $40.00 each. Address: Box 996, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

One #6½ Roots-Connersville Blower with 77" impeller length previously used to furnish air to cupola, 66" inside diameter. Address: **MR. WAYNE E. WEST, GEO. D. ROPER CORPORATION, ROCKFORD, ILLINOIS.**

FOR SALE OR TRADE

1—36" American band saw. Would trade for other woodworking equipment or small gas fired core oven. Value — $175.00. Address: **INLAND FOUNDRY COMPANY, BOX 62, MOSCOW, IDAHO.**

FOR SALE

Used Fremont slip flasks. Various sizes. Address: Box 990, FOUNDRY, Cleveland 13, Ohio.

Electric Melting Furnaces

A large company discontinued its steel foundry—we bought the furnaces.

ELECTROMELT TYPE C Side Charge, 2 ton per hour rated capacity. 7000# to 8000# usual heats. Can handle 16,000# heats. Late type transformers. 1200 KVA, 13,200 volt primary. Complete with all controls.

DETROIT ELECTRIC, 1200# capacity, 13,200 primary voltage. Kuhlman transformers. Complete with controls.

DETROIT ELECTRIC 350#, Type LFA with Kuhlman transformers and oil circuit breaker.

The two larger units may be seen in place.

ACME EQUIPMENT CO., INC., 126 South Clinton Street, Chicago 6, Illinois, Phone: Andover 3-3430.

FOR SALE

AIR COMPRESSOR

Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm synchronous motor, 350 CFM at 100#.

BLOWERS

Spencer Turbo Blower, 2250 CFM at 16 oz. 15 HP 3/60/220 totally enclosed motor. New 1947.

Ingersoll Rand Motor Blower Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220 V. G.E. Induction Motor.

Buffalo 7E Direct Connected Blower, 50 HP Westinghouse motor, 3/60/220-440 V, 3535 rpm, 28" wheel, 3500-4000 CFM at 32 oz. Flanged outlet.

Spencer Turbo Blower. New 1949. 3500 cfm, 28 oz. with 40 HP 220-440 motor and Foxboro controls.

1—Redford Core Blower, bench type.

CONVERTER

100 KW Rotary Westinghouse 220 V 60 cycle primary 250 V DC, complete with controller and panel.

CORE BLOWER

Demmler #3E Dropaway Draw, New 1946.

Demmler #35.

CRANES

5 Ton P & H Overhead Elec. Traveling Crane, 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.

5 Ton P & H Overhead Electric 20'5" span, electric hoist, hand travel both ways, P/B control 440 V A.C.

10 Ton Northern Overhead Elec. Traveling Crane, double girder, fish belly, 3 motors, 230 V D.C., 54'7½" wide C to C of wheels can be cut down to fit smaller size.

Link Belt Model YC9A Boom type Cargo Crane. 20' max. boom, 7½ ton cap. at 5½'. Gasoline motor driven, hard rubber tires. Excellent condition.

CRUSHERS—PULVERIZERS

2—Stedman 15" x 12" Type A. One with 10 HP 220-440 V motor. One without motor.

7—Prater Blue Streak Pulverizers, 30 HP motor.

CUPOLA CHARGER HOIST

Cupola Charger Hoist with 5 HP Star 220-440 V motor.

ELECTRIC FURNACES

2—Bailey (Electric Furnace Co.) 75 KW Electric Arcy type side electrode tilting furnaces and transformers.

FIRE EXTINGUISHERS

St. Regis Model 181 Dry Powder for magnesium fires.

Buffalo 50 gal. soda-acid cart type.

FORK LIFTS

Baker 6000# Gasoline Fork Lift Trucks, KMH60, 120" lift, 88" collapsed height, 42" forks, solid tires. Rebuilt-Guaranteed.

Ross Fork Lift Truck, 19 HT, high lift, 6000# capacity, 14' lift, 48" forks. Pneumatic tires. Rebuilt-Guaranteed.

GRINDERS, DISC

Besley 20S Double End 26" x 2⅜" wheel with 2 compound tables, V belt drive, 15 HP, 220-440 totally enclosed motor, magnetic starter controls.

2—U. S. Model 80 Double End 2-18" dia. wheels, 7½ HP motor, 2 swinging tables 8" x 14"—1 with hand lever feed.

GRINDERS, SNAGGING

McCabe 2" x 24" wheels, 48" between wheels, 3/60/440 V.

Ransom 8B Double End 2" x 20" wheels, 220 V motor, p/b control.

1—Hammond type 20 WR2—3" x 24" wheel, double end grinder, single speed, 20 HP Louis Allis Squirrel Cage, 220-440 V—1760 rpm motor.

2—Norton Type D, 3" x 24" wheel, 66" between centers, flat belt drive.

GRINDERS, SWING

Fox 10 HP 3/60/220 V Swing Frame, 2 speed.

U. S. 15 HP, 3/60/440 V Swing Frame, 2 speed.

Fox 15 HP Swing Frame, 2 speed.

Marschke 20 HP, 2 speed.

HOISTS

500# American LoHed.

1000# Cleveland 220/440 V.

1000# Detroit 220/440 V.

5—1000# P & H Hevi Duty with trolley.

2—2000# P & H Hevi Duty with trolley.

2000# Detroit Electric.

2000# American LoHed.

11—4000# P & H Hevi Duty with trolley.

2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.

2—5 Ton Air Hoists with motor driven trolleys.

LADLES

1 Ton Enclosed Gear Crane Ladle truck type, 4 wheel car for 18" gage track, Whiting Junior.

1—20½" Top Whiting Enclosed Gear Ladle.

MOLDING MACHINES

2—Champion Pin Lift Pushoffs, 46" x 46" x 12" draw.

1—Champion Hand ram, hand clamp, hand rollovers 26" x 14" table.

1—Champion Hand Ram, Hand rollover, Hand draw core machines, 15 x 15 bed.

3—Davenport Portable Jolt Rollover Pattern Draw 20" x 24" tables, open end, 8" draw.

1—International Type G 24 x 10 Jolt Rollover, foot draw, 22 x 30 table, 10" draw.

1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 30.

1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 36.

1—International Type G 30 x 12 Jolt Rollover Foot Draw, 28" x 36" table, 12" draw.

1—International Type G 30" x 30" table, 9" draw, Portable.

2—International Type G 18" x 56" table, 8" draw, Portable.

1—International Type F Jolt Rollover 27 x 12, 12" draw, 35" x 26" table.

1—International Jolt Rollover Pattern 10" Draw, 22" x 30" plate, 6" jolt cylinder.

1—International Plain Jolt Molding Machine 48" x 60" table, no pit required.

1—Herman Jolt Rollover Pattern draw, 40" x 84" table, slotted nickel alloy table over regular table to accommodate various sized flasks, air clamp, new 1946. Used very little.

1—Herman 20" x 30" rollover pattern draw, 750# series. Air clamp.

2—Herman 20" x 24" Jolt Rollover Pattern Draw, 750# series. Air clamp.

1—Herman 4000# Series High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.

2—Milwaukee Arm Type Jolt Squeeze Strippers, 1500# capacity, Model 163-50 Serial 13104-5, 15" x 24" table, 16" x open end, pattern size. Late type.

1—Osborn 76J Portable Jolt Squeeze Molding Machine 12" cylinder.

3—Osborn Jolt Squeeze Molding Machines, 275J, 16 x 20 table, tilt back head.

2—Osborn 405 Jolt Rollover 40" x 70", 2000# capacity, 20" x 60" jolt table and 4 wheel receiving car.

1—Osborn Portable Jolt Rollover Pattern draw, 900# capacity. Model 601-13. 30" x 24" flask size, 10" draw.

1—Tabor 1000# Rollover, 30" x 60" table.

MULLERS AND MIXERS

Simpson #2 Motor on base, bucket loader.
Simpson #3 Motor on base, bucket loader.
Simpson #3 Type H open gear type.
Simpson #3 Open Gear Type. $1000.00.
American Model M Sand Cutter, 70" blades.
Kwick Mix Paddle Type.
Royer NDP 47 14" Belt, 4 rubber tires.
1—Simpson Porto Muller.
1—Simpson #1 Style K Muller with Bucket Loader, 4 cu. ft. size.
1—B & P #30 Speed Muller with Bucket Loader.

ROTOBLAST

Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SHAKEOUTS

1—3' x 5' Link Belt.
2—4' x 6' Simplicity.

SPEED REDUCERS

Cleveland 408-R1, 36 to 1, 20.5 HP.
Falk Motoreducers 7½ HP.
U. S. Syncrogear Motors 7½ HP.
U. S. Syncrogear Motors 5 HP.

TUMBLING BARRELS

Whiting 30" x 48"

WIRE STRAIGHTENERS

2—Climax 1 HP motor.
1—Kane & Roach 3 HP motor.

ACME EQUIPMENT CO., INC.

WE WILL BUY FOR CASH A SINGLE PIECE OF EQUIPMENT OR YOUR ENTIRE FOUNDRY

126 South Clinton Street Phone: Andover 3-3430 Chicago 6, Illinois

AVAILABLE FOR PROMPT SHIPMENT

MOLDING MACHINES

5—**S P O** No. 110J Portable Jolt Squeeze Machines, 1952 machines.
1—**S P O** No. 506 Jolt Rollover Pattern Draw, 600 lbs. Cap., 10" Draw, 24" x 25" table.
1—**OSBORN** #405-79 Rollover Pattern Draw 40 x 72 Table, 3500 lbs Capacity, Serial 10324-C.
6—**OSBORN** No. 275J, Jolt Squeeze Machines, portable and stationary models.
1—**OSBORN** No. 710J, Jolt, Squeeze, Pin Lift, Stationary.
4—**OSBORN** No. 559 HD Jolt Strippers, stationary, Table 25" x 30", Jolt 1200 lbs.
1—**OSBORN** No. 333 H Jolt, Squeeze, Power Rollover, Pattern Draw, 2000 lbs., Jolt, 22" x 44" Table Jolt Cyl. 12", Draw 22".
3—**OSBORN** No. 601-13, Jolt, Rollover, Pattern Draw, 600 lbs. capacity, Flask Length 30".
2—**OSBORN** No. 142 Jolt, Rollover, Foot Draw, 14½ x 24" Table, 8" Draw, 350 lbs capacity.
4—**OSBORN** No. 212 PJ, Jolt Squeezers 17" x 26" Table 12" sq cylinder.
1—**HERMAN PNEUMATIC** 40" x 60", 15" Solid Cylinder Jarring Molding Machine, Heavy duty Bumper type.
1—**JOHNSTON & JENNINGS** Jolt Squeeze Machine.
1—**JOHNSTON & JENNINGS** Model 812S, Stationary Jolt Pin Lift, table size 30" x 38", Draw 12". Capacity 1600 lbs.
1—**JOHNSTON & JENNINGS** Model 1216S Stationary Jolt Pin Lift, table size 36" x 54", Draw 16". Capacity 3000 lbs.
1—**JOHNSTON & JENNINGS** Air Jolt Machine, 20" x 30" Table 6" cylinder.
2—**TABOR** Jolt Rollover and Pattern Draw, Draw 10", 600 lbs. Capacity, 22" x 42" Table, 1946 machines.
1—**TABOR** Jolt Rollover Pattern Draw, 40" x 50" Table, Draw 15". Capacity 2000 lbs.
2—**INTERNATIONAL** Type RES, Size 15" x 8", Jolt Squeeze, Rollover Draw machines, table size 18" x 34".
3—**INTERNATIONAL** Model PKL, Jolt, Squeeze, Air Pin Lift Machines, 18" x 24" Table, Lift 5½", Squeeze Cylinder, 12".
5—**INTERNATIONAL** Type "R" Hand Ram, Hand Turnover, Foot Draw Machines.
2—**INTERNATIONAL** Type "HJ" Jolt Ram, Hand Turnover, Foot or Hand Lever Draw Machines. Various sizes.
4—**INTERNATIONAL** Type G, Air Jolt, Air Turnover Foot Draw Machines, Sizes 20" x 8"—24" x 8"—30" x 8".
1—**CHAMPION** JS-10-P. Jolt Squeezer, Portable, Serial No. 5770, Table size 18" x 26".
1—**CHAMPION** Model No. JM 16, Serial No. 5092, Power Jolt, Hand Turnover, Foot Draw Machine, 13" x 17" table.
2—**DAVENPORT** Model SA-34, Jolt Rollover and Pattern Draw 2500 lb. Jolt Capacity, 15" Draw, 34" x 48" table.
1—**DAVENPORT** Model 28, Jolt Rollover, and Pattern Draw, 1500 lb. Jolt Capacity, 12" Draw, 30" x 40" table.
3—**MILWAUKEE** Model 123-13, Jolt, Squeeze, Machines, 12" cylinder, 17" x 26" table.
6—**MILWAUKEE** Model 214 Car Type Jolt, Squeeze Stripper, 10" Draw, 18" x 38" table, Jolt Capacity 2500 lbs.

MULLERS

1—**SIMPSON** No. 0 Sand Muller, 175 lb. batch. Late type with motor and drive.
1—**SIMPSON** No. 1-H Sand Muller, Unit Drive, 600 lb. batch, 1947.
1—**SIMPSON** No. 1½ Sand Muller, Unit Drive, 750 lb. batch. Late type with Skip Hoist.
1—**SIMPSON** No. 2 Sand Muller. Complete with motor and drive. Open Gear type.
1—**SIMPSON** No. 3 Sand Muller, Open Gear Type with Motor Drive.
2—**BEARDSLEY & PIPER** No. 70 Speed Mullers.

SAND PREPARATORS

4—**BEARDSLEY & PIPER** Model "S" Screenerator, Pneumatic Tires.
1—**BEARDSLEY & PIPER** Model "L" Screenerator, on pneumatic tires.
1—**BEARDSLEY & PIPER** Sand Conditioner, complete with magnetic separator, 20 H.P. totally enclosed motor, overhead hopper, largest model made. Serial Number SC-73, 1945 machine.
1—**ROYER** Model NB-2 Sand Conditioner, portable, 7 to 9½ tons per hour.
1—**ROYER** Model NC-4 Sand Conditioner, portable, 12 to 15 tons per hour.
1—**ROYER** Model C-2 Sand Conditioner, portable, 25 to 30 tons per hour.
1—**JEFFREY** Type "P" Sand Conditioner, Class B Mixer. Portable. Serial No. 377.
1—**AMERICAN** Sand Cutter, Model AM, Size 69 x 45.
2—**AMERICAN** Sand Cutters, Model "M" Size 80/79.

CORE OVENS

1—**COLEMAN** Core Oven, gas fired, 4 doors opening into single compartment, 42" wide, 50" high and 31" deep, adjustable trays on 3" centers.
1—**COLEMAN** Core Oven, Gas Fired, 15' x 10' x 8', drawer type.
2—**DESPATCH,** Gas Fired, Drawer Type Core Ovens, Drawers 46" wide, 59" deep, 9" high. Complete with Rail Supports and Controls. These machines are in excellent condition and were new in 1944.

CORE BLOWERS

1—**OSBORN** No. 91 Core Blower, Serial 10050.
2—**OSBORN** No. 92 Core Blowers, Serial No. 9703A. Air Clamps.
1—**DEMMLER,** No. 1-E Core Blower, Serial No. 3287. Equipped with Air Clamps, 1950 Machine.
1—**DEMMLER** No. 2 Core Blower, Air Clamps.
2—**REDFORD** No. 1, Cartridge Bench Type.

GRINDING EQUIPMENT

2—**FOX** No. 3-A High Speed Stand Grinder. Wheel size 20" x 2" x 10", 5 H.P. motor.
1—**HAMMOND** Model WR-1 Double End Snagging Grinder, 7½ H.P., 220/440/3/60.
2—**HAMMOND** Model WH-10 Double End Grinders with (2) 7½ H.P. 220/440 3 phase, 60 cycle, wheel size 20" x 2" x 2".
2—**U. S. ELECTRIC** Double End Snag Grinders, 20" Wheel, 5 H.P. Motor.
1—**QUEEN CITY** Model 100 Double End Disc Grinder with 10 H.P. 220/440 Volt Motor, size 20" x 2" x 2", Very Late Machine.

SAND BLASTING EQUIPMENT

1—**AMERICAN WHEELABRATOR** Tumblast, 48" x 72", 30 cubic ft. cap.
1—**AMERICAN** Wheelabrator Tumblast, 36 x 42, with Skip Hoist & Shot Return. Serial No. A-37913.
1—**AMERICAN** Wheelabrator Multi-Table Blast Machine, 8-27" Tables, with Shot Return and Dust Collector. Serial No. A-44791, Model BM 66900.
PANGBORN Room Blast 10' x 12' x 12', complete with Tank, Elevator, Dust Collector and Safety Equipment.
1—**SLY** Tumbling Barrel 48" x 75"—¾" Plate, Dry or Wet. Equipped for Dust Collector.
1—**SLY** Tumbling Barrel 48" dia. x 12' long, 1¼" plate with 40 H.P. motor.
1—**NEW HAVEN** Air Blast Barrel 48" x 42". Equipped with Motor and Drive, 1942 unit.
1—**PANGBORN** Air Blast Cabinet. Model EN2, Size 5' x 3' x 7'1" high, with Dust Collector.
2—**WHITING** Tumbling Barrels, 30" x 60" x 1" Plate. Complete with motor, machine etc. 1952 units, like new.

MELTING FURNACES

1—**YORK WALKER** No. 28 Tilt Furnace, 300-400 crucible coke fired.
3—**FISHER** Model MNP Tilting Furnaces, 2000 lbs. capacity in Aluminum, 1500 lbs., for magnesium, complete with New Pot, blowers, and electrical tilting mechanism. Offered at Tremendous Savings.
5—500 lbs. capacity Holding Furnaces, newly bricked.
2—**BELLVIEW** Furnaces, 550 lbs capacity, with Pots. Open Gear Tilting.
2—**STROMAN** Model NP Hydraulic Tilting, 200-225 crucible Melting Furnaces, with motor, blower, pump, 1948 units.
1—**REDA** 550# hydraulic tilt, gas or oil fired, with oil pump etc. 1952 unit.

LADLES AND POURING DEVICES

3—**MODERN** Pouring Device, Model "F", Ladle Hoists, with 15" Taper Covered Ladles, 500 lbs. capacity with Hand Tilting Devices.
1—**WHITING** 1-ton Gear Enclosed Tilting. 27" diameter, Nose Tilting.
1—**WHITING** Ladle 10 tons, tilting, totally enclosed gearing, nose pouring.
1—**WHITING** Ladle, 2 tons, tilting, totally enclosed gearings, nose pouring.

CONVEYORS—Apron—Roller—Belt—Trough

1—**FARQUHAR** 18" x 30' Model 343 Trough Conveyor with 5 HP motor, starter, 3 sided feed hopper. 1952 unit.
1—**FARQUHAR** 167' x 24" Trough Conveyor, 375' of 5 ply belting, 15 H.P. Motor and Drive, New in 1952.
1—**GODFREY** 18" x 19' Under Car Unloader, with 3 H.P. Motor, Steel Belt.
1—18" x 24' Apron Conveyor, Steel Link Belt, complete with motor and drive.
1—24" x 20' Apron Conveyor, Steel Link Belt.—Less motor and drive.
200'—**MATHEWS** Roller Conveyor, Above Rail 20" wide, 2½" Rollers, on 4" Centers.
300'—**MATHEWS** Roller Conveyor, Above Rail 24" wide, 2¾" Rollers.
200'—Heavy Duty Roller Conveyor 30" wide, 3" Rollers on 6" centers, ¾" shaft, 4" channel, Roller above rail.
200'—Roller Conveyor 8" wide, 2" Rollers, above rail.
100'—Roller Conveyor 14" wide, 2" Rollers, above rail.

AIR HOISTS

3—**DETROIT** Pneumatic Hoists 2000 lbs cap. Type P.
2—**DETROIT** Pneumatic Hoists 4000 lbs cap. Type P.
1—**CHICAGO** Pneumatic Hoist 2000 lbs cap.
2—**INGERSOLL RAND,** Size D, 4000 lbs. Late type Air Hoists.
2—**INGERSOLL RAND,** Size B 1000 lbs. Late type Air Hoist, complete with Trolleys.
1—**LITTLE GIANT,** Model A, 1000 lbs. cap.
4—**THOR PNEUMATIC,** 1000 lbs. capacity, low head room.

SHAKEOUTS

1—**SIMPLICITY** Shakeout, 3' x 3', Serial No. 33—SOS—106, Model S, 1000 lbs. capacity.
1—**SIMPLICITY** Shakeout, 4' x 6', Model D, 16,000 lbs. capacity, 10 H.P. Motor.
1—**SIMPLICITY** Shakeout, 5' x 7', Serial No. 57—SOBG—185, 5000 lbs. capacity.
1—**SIMPLICITY** Shakeout, 4' x 6', Serial No. 46—SOB—145, Model B.
2—**SIMPLICITY** Shakeouts, 4' x 8', Serial No. 48—SODE 104, 16,000 lbs. capacity.
1—**ROBBINS,** 4' x 10', Floatex Model, Serial F-609, 7½ H.P. motor and V-belt Drive.

LIFT TRUCKS

2—**BAKER RAULANG** Electric Fork, 4000 lbs. capacity, 119" lift. Like new!
1—**AUTOMATIC** Platform Lift Truck, 3000 lbs. capacity, lift 6', battery operated.
5—**LEWIS SHEPARD,** 4000 lbs. capacity, Jack Lift Trucks, hydraulic, 1950 models, 28" x 40", will take 10", 11" or 12" skid.
1—Automatic 10,000 lbs. platform Low Lift with Ready Power Unit.

BLOWERS

1—**BUFFALO FORGE** No. 7-E Blower, 25 H.P., 3600 rpm, 220/440 volts, 28" wheel, 32 oz., 1600 cfm.
5—Assorted Blowers for Furnaces, 2-3-5 H.P., 16 oz.
1—**NORTH AMERICAN** Turbine Blower, 24 oz., 1900 cfm, with 20 H.P.

CUT-OFF SAW

1—**TABOR** Abrasive, Cut-off Saw, Type CAF, 10 H.P. Motor, Serial 29219, 1952 unit.

MISCELLANEOUS

1—No. 540 Comb. Lab Sifter with sieves.
1—No. 440 Sand Strength Machine w/motor, drive, accessories.
1—**INGERSOLL RAND** Air Winch. Size MHO.
1—**SCHMEIG** Spark Arrestor.
1—**READY POWER** Unit, 4 cylinder, 36 vel's.
2—**READY POWER** Units, 6 cylinders, 36 and 48 volts.
1—**RIEHLE** Tester, 100,000 lbs. capacity. Screw type.
1—**RIEHLE** Tester, 150,000 lbs. capacity. Screw type.
3—Electric Riddles, 21" diameter, ¼ H.P. Motor, 110 volts.
1—**CLIMAX** Wire Straightener No. 2.
2—**SYNTRON** Vibra Flow Feeds, Type F 210, Style 1538.
3—**LEEDS & NORTHRUP** Model "S" Micromax.
1—Cupola Lighter, Tank and Torch.
1—**HOWE,** Weightograph 6000 lbs. capacity 4' x 5' Platform.

AAA MACHINERY & EQUIPMENT CO.

856 EDDY ROAD—CLEVELAND 8, OHIO

(Licensed Auctioneers, Specializing in Foundry Liquidations)

Phone: Liberty 1-6545

LIBERAL ALLOWANCES FOR YOUR IDLE EQUIPMENT

FOR SALE

Molding Machines

1—Link-Belt "Merry-Go-Round" Roller type mold conveyor complete with 35 cars 38″ x 72″
2—6000# Herman Jolt Rollover & Pattern Draw
2—#405-95 Osborn Jolt Rollover & Pattern Draw, 26″ draw
2—SA34 Davenport Jolt Rollover & Pattern Draw
1—SA28 Davenport Jolt Rollover & Pattern Draw
1—SA24 Davenport Jolt Rollover & Pattern Draw
2—30″ x 40″ Tabor Jolt Rollover & Pattern Draw
2—22″ x 32″ Tabor Jolt Rollover & Pattern Draw
4—814-P Osborn Jolt Squeeze Pin Lift
2—2114 Portable Jolt Squeeze Pin Lift SPO
2—#815 J & J Jolt Rollover & Pattern Draw
1—34AJS Davenport Jolt Stripper, 34″ x 46″ table
2—Herman Jolt Strippers 40″ x 60″ table
1—Osborn Jolt Stripper 3′ x 16′ table
2—#559 Osborn Jolt Strippers, 25″ x 30″ table
2—International Type JFL Jolt Ram, foot-lever, pin-lift
3—International Type R Hand Rollover
Jolt Squeeze Molding Machines—SPO—Osborn, Tabor, Modern

Furnaces & Blowers

2—Lindberg 48″ x 60″ electric recirculating heat treat furnaces, 90 KW, 1400°, 230 volts
1—500# Hausfeld Hand tilting
1—Stroman #14 non-tilt
1—Cupola blower—Spencer Turbine 50 HP 220/440/3/60 16 oz.
1—Cupola blower—North American 20 HP 220/440/3/60 24 oz.
1—Cupola blower—5½ Piqua 220/3/60, 30 H.P.
2—Furnace Blowers—3 H.P. 220/440/3/60 16 oz.

Core Blowers

1—#3E Demmler—weight of core up to 35 lbs.
1—#2K Demmler—weight of core up to 20 lbs.
1—#1 Demmler—weight of core up to 10 lbs.
6—#92 Osborn—weight of core up to 35 lbs.
1—194-1 Osborn, weight of core up to 100 lbs.
3—Redford Bench type cartridge up to 2 lbs.

Sand Mullers

1—#3 Simpson 30 cu ft capacity. Model H Style E
1—#2 Simpson 14 cu ft capacity, Model H, Style E
1—#610 Clearfield 14 cu ft capacity under drive, with motor
2—#70 Beardsley-Piper 18 cu ft per batch
1—22″ x 78″ Link-Belt Paddle type
1—Link-Belt Pugmill 42″ x 96″

Shake-outs

1—4′ x 6′ Simplicity Model D 16000# cap., 10 H.P. 220/440/3/60
1—4′ x 6′ Robbins 8000# cap.
1—4′ x 10′ Robbins, 12000# cap., 7½ H.P. 220/440/3/60

Sand Slingers

2—16″ head Beardsley-Piper Stationary 10 H.P. 220/440/3/60

Grinding Equipment

2—Fin Cleaning Machines for cylinder heads—Ireland
1—#30 Gardner double end disc grinder, V-belt driven
1—#6 Cheesly disc grinder dir. conn. 18″ wheel
1—10 HP Black & Decker dble end 20″ x 3″ wheels 220/440/3/60
2—7½ HP Safety Emery Wheel dble end 18″ wheels 220/3/60
4—5 HP Safety Emery Wheel dble end 18″ wheels 220/3/60
1—3 HP double end grinder, flat belt driven 220/440/3/60
1—7½ HP Universal Swing Grinder 220/440/3/60

Cranes & Hoists

1—40′ overhead bridge crane, 3 ton capacity, cab operated 220/440/3/60
1—30′ span hand travelling bridge crane
1—20′ span hand travelling bridge crane
3—12′ span hand travelling bridge crane
6 Louden Monorail systems
Ingersoll-Rand airhoists 1000# to 6000#
Electric Hoists ½ ton to 1 ton

Air Compressors

1—40 HP Ingersoll-Rand single stage horiz. 220/440/3/60
1—150 HP Ingersoll-Rand two stage horiz. 220/3/60

Misc. Foundry Equipment

2—American Sand Cutters, Type AA
1—Atlas Car & Mfg. Co. Car scale
2—Charging cranes for cupolas, Shepard 3 ton cap. D.C.
1—Uni-Wash Newcomb-Detroit Wet dust collecting system
1—Pigmold conveyor 64′ centers, Link-Belt
1—6500# Toledo Floor scale
12—Whiting and Modern Pouring ladles, 350# to 1800#
100′—24″ Belt Conveyor, frame, troughing idlers, drives, etc.
2—#3 Jeffrey electric vibrators
4—#4 Jeffrey electric vibrators
1—2 compartment Coleman Core Oven, 6′ x 8′ doors
1—2 compartment Rybolt Core Oven, 4′ x 6′ sliding doors
8—Cleaning cabinets for magnesium with exhausters & motors
Roller conveyor above rail, 14″ to 36″ in width
1—Impregnating room fully equipped
1—Blaw-Knox Clamshell bucket size 308-F
1—Link-Belt aerator with drive complete
2—1000 Gals. p. Min. Centrifugal Pumps, I-R., 30 HP 220/440/3/60
1—Link-Belt Core Breaker Drum 6′ x 10′
1—Revolving Core conveyor table—Bush-Lawrence
1—#55 American Dust Collector 3300 CFM
2—Tumbling barrels, 18″ x 36″ and 48″ x 75″

WHILE AT THE FOUNDRY SHOW IN CLEVELAND STOP AT OUR BOOTH FOR OUR LATEST LISTINGS AND TRANSPORTATION TO OUR DISPLAY ROOMS AND WAREHOUSE. SEE THE LARGEST STOCK OF FOUNDRY EQUIPMENT IN THE MIDWEST.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 Saranac Rd., Cleveland 10, Ohio **Telephone: Glenville 1-1222, 1-1538**

FOUNDRY LIQUIDATION

We have recently purchased the foundry equipment of a large Cincinnati Valve Manufacturer—The equipment is still in place but we must move it at once.—Priced for quick sale—Send for complete list

CONVEYORS

Bucket Conveyors some new 1952
Flat Belt Conveyors
Incline Belt Conveyor
24" x 40' Steel Apron Conveyor
Shakeout Conveyors
Atlas Portable Belt Conveyor with Perma Mag. Pulley
24" Belt Conveyor with magnet

CORE ROOM

5' x 10' Young Elec. Cartype Oven
6' x 10' Young Elec. Cartype Oven
Battery of 4—5 drawer Foundry Equip. gas fired ovens (late)
Battery of 3—5 drawer Foundry Equip. gas fired ovens (late)
3—10' x 18' gas fired mold drying ovens car type
International core jolt machines
Core buggy
Core Racks oven or storage.

COMPRESSOR

Ingersoll 5 x 5 SSERI 10 hp.

CUPOLA

2—Newton 54"

CUPOLA BLOWERS

Ingersoll-Rand 7500 CFM 32 oz 75 hp late

ELECTRIC FURNACE

Detroit type AA Electric Rocking type furnace 1500# cold charge—complete with transformers

GRINDERS

Fox Single Wheel Snagging
US—Double End Snagging
Fox Swing Frame
Air Grinders

LADLES

All sizes of ladles from small 50# hand ladles up to 7000# geared top or bottom pour, covered ladles, mixing ladles or cylindrical covered.
Ladle heaters

MOLDING MACHINES

Over 50, all sizes Davenport Rollover Air Clamps, jolt pin lifts International type G Rollovers stationary or portable also jolt squeezers.
Nichols Jolt Squeezers—Spo portable jolt squeezers.

MILWAUKEE 217-130 Jolt Squeeze Rollover Draw 12" draw Serial 15566—35" x 41" max flask size VERY LATE

MOLDING HOPPERS

15 Station hopper line

SAND HANDLING

B & P Sand Preperator New 1952

Elevators—Conveyors—Rotary Drum sand screen—Steel Slat conveyors
Rotoclone type W

SHAKEOUTS

4 x 6 Simplicity (late)
6 x 8 Simplicity (late)

MISC

This was a complete foundry, space will not permit listing all the equipment. Send for list.

For further information write—wire—or phone

ACME EQUIPMENT CO., INC.
126 S. Clinton Street Chicago 6, Ill.
Phone Andover 3-3430

GREEN BROTHERS
511 Freeman Cincinnati 3, Ohio
Phone Main 2192

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words or less, $3.00. Additional words 10c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $6.00. Additional words 20c each.

NOTE—If replies are to be sent to a box number in care of FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 18.00	$ 16.50	$ 15.00	$ 13.50
2 inches	32.50	30.00	27.50	25.00
3 inches	46.50	43.00	39.50	36.00
4 inches	60.00	55.50	51.00	46.50
5 inches	73.00	67.50	62.00	56.50
6 inches	85.50	79.00	72.50	66.00
7 inches	97.50	90.00	82.50	75.00
8 inches	109.00	100.50	92.00	83.50
9 inches	120.00	110.50	101.00	91.50
10 inches (1 col.)	130.50	120.00	109.50	99.00
Half page	195.00	180.00	165.00	150.00
Full page	330.00	300.00	270.00	240.00

Remittance should accompany advertisement when submitted—Cash Discount 2%, 10 days.

Classified Forms Close the 13th of Month Preceding Issue

FOUNDRY

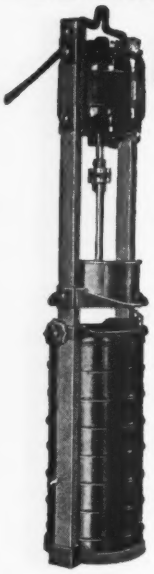
PENTON BUILDING • CLEVELAND 13, OHIO

COMBS FOUNDRY RIDDLES

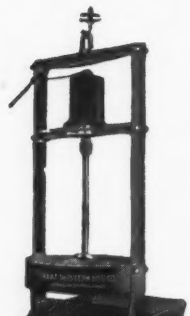
Screen Core & Moulding Sand

• FASTER!
• CHEAPER!

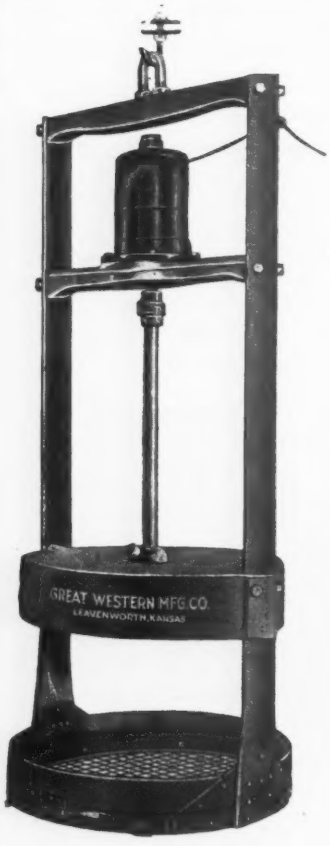
WORLD FAMOUS!



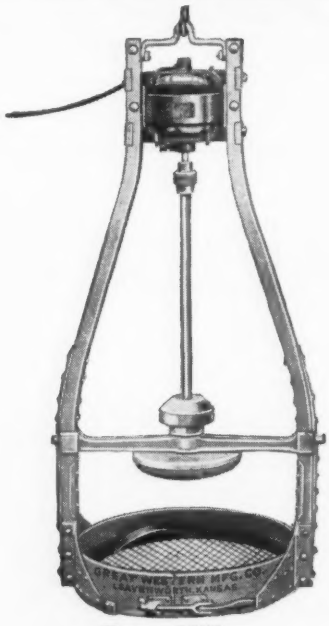
Type "HL" Lab Sifter for sand control $225.00 without sieves



Type "CS" with 24″ square screen and automatic discharge $320.00



Type "CR" with 24″ sieve $310.00



Type "Y"

With 20″ sieve $250.00
Also made with 36″ sieve $450.00

All these machines cost less than 1¢ an hour for power. Quickly removable steel rim sieves can be removed, emptied and replaced in seconds. Saves up to 97% of your labor costs. Send for free descriptive folder.

Prompt Delivery From Your Foundry Supply House

GREAT WESTERN MFG. CO.

LEAVENWORTH • KANSAS

Step ahead in this five billion dollar market with

Foundry's

PLUS 5 SERVICE

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

A Penton Publication

FOUNDRY

more than a magazine . . . a complete sales development service

Penton Building, Cleveland 13, Ohio

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To the Employee Relations Director of every American company

LET'S FACE IT . . . the threat of war and the atom bomb has become a real part of our life—and will be with us for years. Fires, tornadoes and other disasters, too, may strike without warning.

The very lives of your employees are at stake. Yours is a grave responsibility. Consider what may happen.

When the emergency comes, everybody's going to need help at the same time. It may be hours before outside aid reaches you. The best chance of survival for your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. To be unprepared is to gamble with human lives. Disaster may happen TOMORROW. Insist that these simple precautions are taken TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's entirely integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here again, your CD Director can help—with advice on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First Aid Training Courses.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good employee relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.

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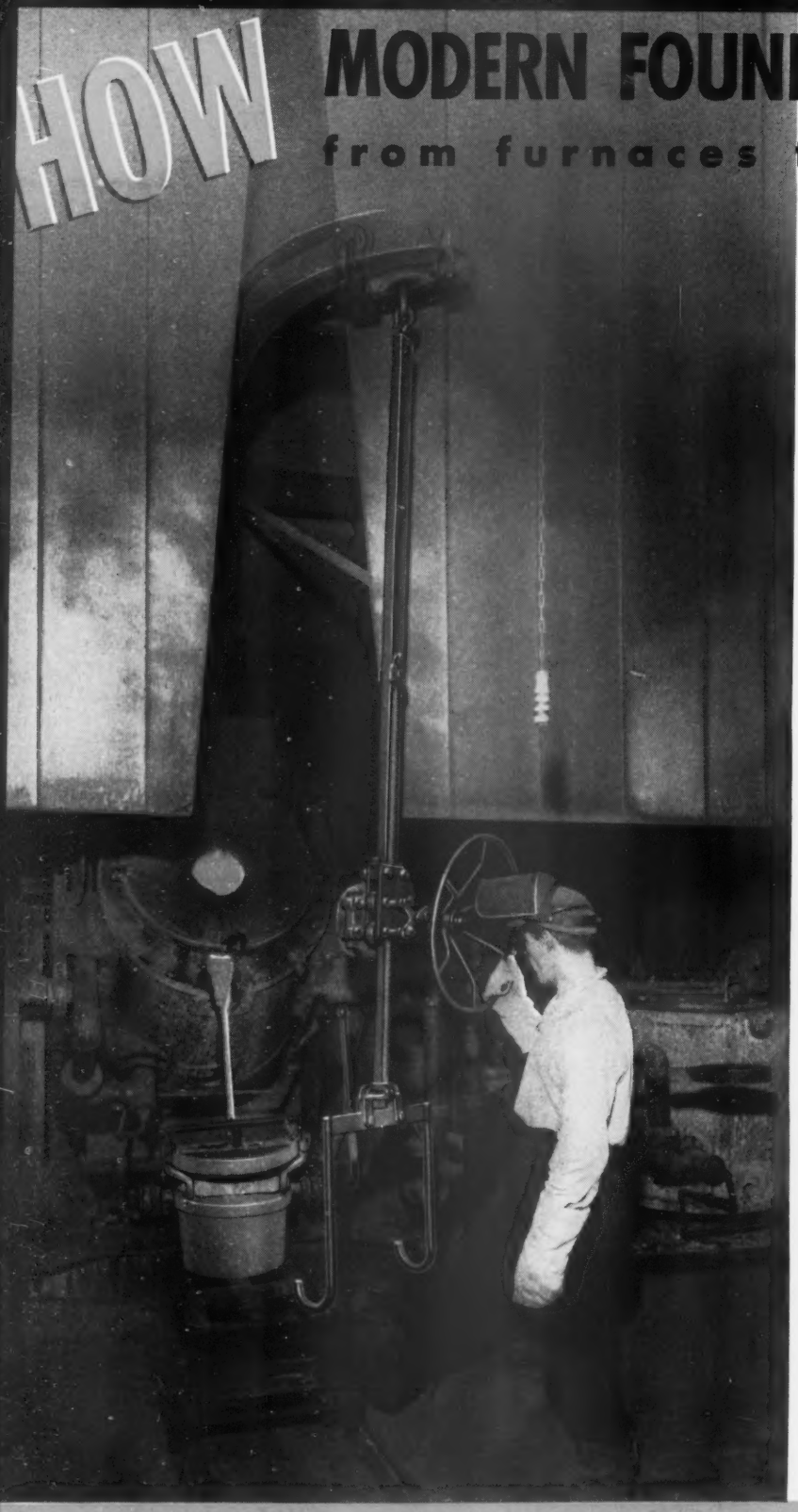
HOW MODERN FOUNDRY METHODS PAY

from furnaces to finished parts...



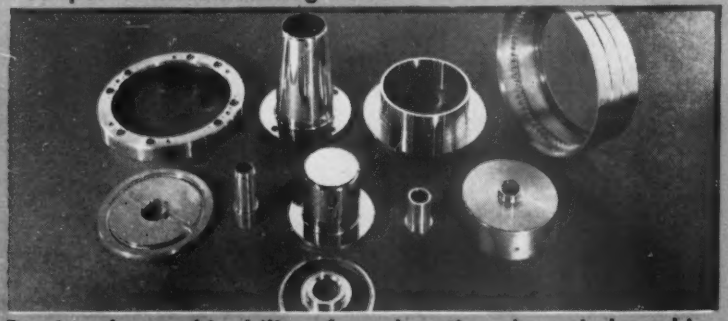
here in one of America's, prominent, non-ferrous foundries every known, modern method is put to work for safety's sake. It's a pre-planned operation that safeguards the high quality of Ampco* (aluminum bronze).

MODERN Pouring Devices with their quick-detachable bails swing into action to handle, alternately, ladles and crucibles with their heavy loads of precious metal. More perishable than fresh milk the metal flows, at highly uniform temperatures and without interruption, from covered, MODERN ladles. And right along with this maximum safety protection for men and metal, there follows an ease of operation that insures the day-after-day high yield from furnaces to loading docks.

Ampco's* turning of finished castings into finished parts is an interesting operation — as modern as it's melting and pouring methods.. as practical as tomorrow's foundry planning.

Through a closely WORKING TOGETHER with successful foundrymen, here and everywhere for more than thirty years, MODERN engineers have pioneered and are continuously expanding new uses for MODERN Pouring Devices. Today there's a Device and a method for every pouring-floor-need. SO whether you put up a couple floors a day or pour a hundred tons of metal in a round-the-clock operation it will pay you well to get the entire story. Literature and films are available to foundrymen. Returning the coupon will start things moving in your direction . . . .

Model FA Pouring Devices are quickly attached to ladle trunnions and crucible shanks with top safety for pour-off men.
*** Ampco — trademark registered**



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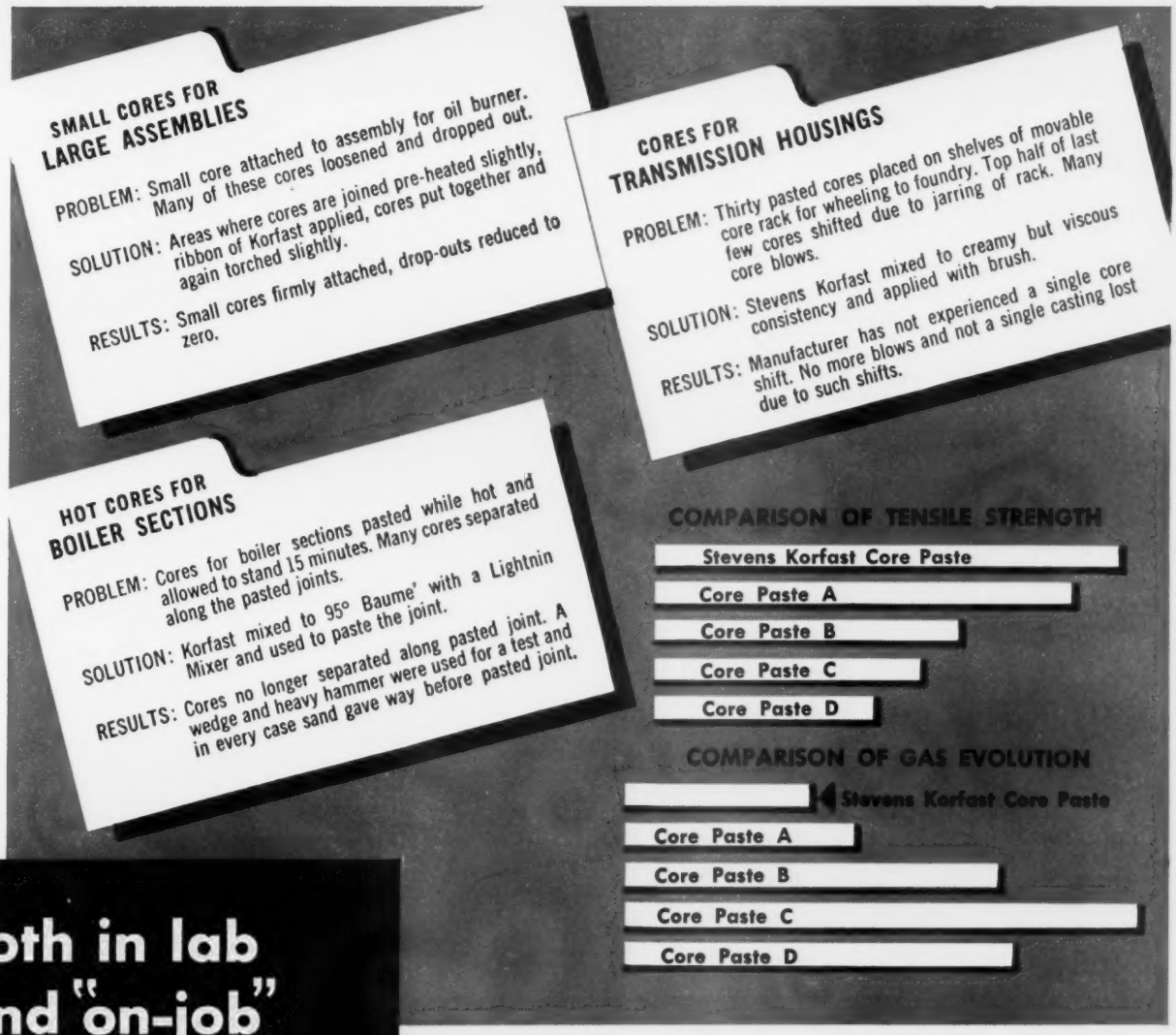
SMALL CORES FOR LARGE ASSEMBLIES
PROBLEM: Small core attached to assembly for oil burner. Many of these cores loosened and dropped out.
SOLUTION: Areas where cores are joined pre-heated slightly, ribbon of Korfast applied, cores put together and again torched slightly.
RESULTS: Small cores firmly attached, drop-outs reduced to zero.
CORES FOR TRANSMISSION HOUSINGS
PROBLEM: Thirty pasted cores placed on shelves of movable core rack for wheeling to foundry. Top half of last few cores shifted due to jarring of rack. Many core blows.
SOLUTION: Stevens Korfast mixed to creamy but viscous consistency and applied with brush.
RESULTS: Manufacturer has not experienced a single core shift. No more blows and not a single casting lost due to such shifts.
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PROBLEM: Cores for boiler sections pasted while hot and allowed to stand 15 minutes. Many cores separated along the pasted joints.
SOLUTION: Korfast mixed to 95° Baume' with a Lightnin Mixer and used to paste the joint.
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COMPARISON OF TENSILE STRENGTH
Stevens Korfast Core Paste
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Core Paste B
Core Paste C
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COMPARISON OF GAS EVOLUTION
Stevens Korfast Core Paste
Core Paste A
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The final test of product superiority is doing the job where others have failed. That's why Stevens Korfast is becoming known as "King of the Core Pastes." Korfast's iron-grip tensile strength, low gas evolution, greater "green grab" and faster drying qualities make it tops in performance in pasting all types of dry sand cores.

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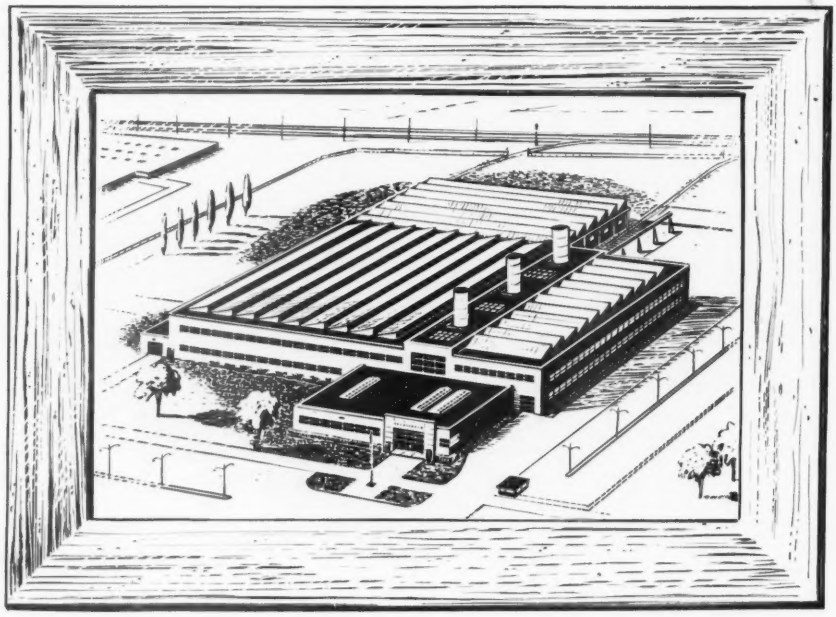

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